

**LIVING COLLECTIONS****Summer 2005**

Dear Colleague:

Enclosed please find sample narratives, schedules of completion, and summary budgets from five successful applications from the 2005 IMLS Conservation Project Support (CPS) grant competition.

The attached samples were selected because they demonstrate how individual institutions with different conservation needs successfully developed projects that address those needs. We feel these narratives are logically and clearly presented, and give sufficient information to support the request.

This packet contains two samples that represent different types of conservation projects. They emphasize the overall institutional conservation perspective, the involvement of conservation professionals in all phases of the project, and the importance of the project as the highest institutional priority for collections care.

In addition, there are three samples of funded education components. We hope that these samples give you the impetus to partner with your staff educators to develop your own creative way to educate the general public about your conservation project.

The samples included in this packet are listed on the next page of this document. No endorsement by IMLS of any personnel, conservation facilities, private firms, or conservation procedures and methods identified in the narratives should be assumed.

I hope that these sample narratives will be useful to you as models for structuring a proposal for your conservation needs. IMLS program staff is available at (202)653-IMLS or [imlsinfo@imls.gov](mailto:imlsinfo@imls.gov), and will be happy to discuss any questions you have as you develop your proposal.

The application deadline for the 2006 Conservation Project Support grant program is:

**October 1, 2005**

Applications for CPS are available from the IMLS Web site (<http://www.imls.gov>), or by calling IMLS at (202)653-IMLS. We look forward to receiving your application.

Sincerely,



Mary Estelle Kennelly  
Associate Deputy Director for Museum Services

### Sample Conservation Projects: Living Collections

Project Type	Organization	State	Project Budget	Organizational Budget	Discipline
Living— Research	Chicago Zoological Society	IL	\$200,293	\$45,498,000	Zoo
Living— Detailed Survey	North Carolina Botanical Garden	NC	\$57,646	\$1,457,377	Arboretum/ Botanical Garden

### Educational Components

Living— Educational Component	University of California—Arboretum Santa Cruz	CA	\$46,940- \$9,800 for ed. component	\$785,000	Arboretum/ Botanical Garden
Non-Living— Educational Component	Norwich Free Academy—Slater Memorial Museum	CT	\$36,427- \$3,465 for ed. component	\$195,000	Art
Non-Living— Educational Component	Good Will Home Association, L.C. Bates Museum	ME	\$21,305- \$2,561 for ed. component	\$87,676	General

## **Chicago Zoological Society**

Chicago, Illinois

Project Type: Research

IMLS Award: \$200,293

Match: \$209,328

Total Project: \$409,621

Museum Budget: \$45,498,000

\$200,293 to conduct a study of pedigree reconstruction to sustain zoo populations, which will improve pedigree analysis and management in cases of incomplete pedigree records.

## Pedigree Reconstruction to Sustain Zoo Populations

### **1. What is the design of the Project?**

**Project Activities:** Self sustaining populations are crucial to the continuing operation of zoos. For species that are maintained in large social groups with multiple males, paternity and sometimes maternity are not known with certainty. American Zoo and Aquarium Association (AZA) Population Management Center (PMC) biologists state that up to 95% of the current studbooks validated by the Regional Studbook Data Management Center list individuals with unknown parentage. Pedigree reconstruction offers a means to ensure captive populations remain viable by returning individuals to the breeding population. It is vitally important for species that are threatened and declining in the wild that all available space is occupied by individuals who can contribute to the gene pool of subsequent generations.

The broad purposes of this project are to provide genetic testing for two taxa (ring-tailed lemurs and Inca terns) with different breeding systems that would benefit directly from pedigree analysis; to evaluate the efficacy of genetic testing to reconstruct pedigree lines; and to provide better methods and tools for managing species that have partly unknown or uncertain pedigrees. More specifically, we will:

1. Use DNA analyses to reconstruct pedigree information, thereby returning as many individuals as possible to the breeding population, increasing the efficiency of population management.
2. Test, through simulation and analytical methods, the gain in effectiveness of genetic management as an increasing proportion of a population's pedigree is determined.
3. Develop methods for using information on uncertain pedigree relationships (for example, several possible sires, or a group of animals with kinships that can be estimated from DNA data but not calculated from pedigrees).
4. Incorporate tools for merging DNA and traditional pedigree data, and for using information on uncertain relationships, into a revised software program for use by all zoos.

Thus, this project will combine empirical analyses on species of concern, theoretical analysis of the broad concepts being addressed, and development of tools to facilitate application to these and other cases.

**How this project meets institutional conservation goals:** Brookfield Zoo maintains both species that will be the focus of the empirical aspects of this project, and the zoo maintains the studbook for one of the two species. The zoo maintains many other species that suffer from similar difficulties of uncertain pedigrees, often in group-living taxa (e.g., Guinea baboons, Humboldt penguins, Siberian ibex, addax, Rodrigues bats). This project will help meet a critical need of all AZA institutions that hold animals that are currently excluded from breeding plans because of unknown or uncertain pedigrees. The AZA steadily, and appropriately, adds more species to the list of those that are being managed. Yet, Taxon Advisory Groups (TAGs) are finding that their ability to manage the diversity of species they desire is often severely hampered by a lack of sufficient numbers of animals in the breeding programs, and by high percentages of animals of unknown or uncertain parentage. Being able to utilize higher percents of each population as potential breeders will considerably increase the numbers of species that can be managed with limited resources. Most TAGs are currently working on selecting species for their Regional Collection Plans or revising earlier plans, so it is especially important to determine how well the gaps in pedigrees of problematic species can be resolved.

**Goals and objectives and how they will be met:** This project will determine how best to use partial pedigree information within population management plans and assess how molecular techniques can improve our knowledge of pedigrees. We will work with two species that have different breeding structures and consequently, different pedigree questions, to provide as much information as possible for those management plans and to explore the use of molecular methods. One Species Survival Plan (SSP) primate species (*Lemur catta*, ring-tailed lemur) and one Population Management Plan (PMP) bird species (*Larosterna inca*, Inca tern) were selected for pedigree analysis. The investigation for each species has the support of the Species Coordinator and the TAG Chair. (See attached letters of support.) Although we already have many of the needed samples in hand, and we have the enthusiastic cooperation of the program managers, we recognize that we will not be able to obtain every sample that could be useful. The extent to which lack of cooperation by holding institutions or lack of samples from dead birds inhibits complete pedigree reconstruction, and the extent to which we can provide improved management based on those data we do collect, will be important indicators of the success that can be expected if this approach is applied to other species. In pedigree reconstruction of the ring-tailed lemur and the Inca tern populations, each individual that is returned to the breeding group will be a success. For individuals who cannot be fully resolved, placing them into a lineage, identifying probabilities of parentage, or estimating degrees of kinship would allow their use within breeding programs — if we can also develop better methods for using such partial information. We will measure success by how much gene diversity can be documented and preserved in these populations by returning animals to the breeding group. Projections of gene diversity retained over time will be made using the PM2000 software<sup>[1]</sup>. Details of methodology

and process learned by working with these two species, a group-living mammal and a colonial nesting bird, will provide information that can make a similar process for other taxa more effective. For example, we will learn which studbook data and historical records are most helpful for reconstruction and what level of pedigree resolution is necessary, realistic, or useful. Our tests of pedigree verification will demonstrate the value of banking samples from each individual, and how those samples would contribute to resolution of genetic management issues. Our simulation studies will demonstrate the effects of using additional pedigree information on the long-term projections for managed populations. Finally, we will use the results of the studies to develop the tools necessary for optimal use of all available data for managing pedigrees of all species in zoo collections.

**Staff Time:** To complete the empirical data collection, Dr. Dubach will spend 40% of her time; S. Schultz, a research assistant, will spend 25% of her time; R. Thompson will devote 15% effort to managing databases; a research assistant (to be hired) will spend 100% of time for two years on DNA analyses. The theoretical component of the project, using simulation methods, and the development of new tools for genetic management of uncertain pedigrees, will require 10% time by Dr. Lacy, 100% time (for 2 years) by a post-doctoral researcher, and 500 hours of programming work by JP Pollak (as contracted services).

**Schedule of completion:** Many samples from both taxa have already been banked by the zoo. This will allow us to begin DNA analyses at the start date, and to proceed with these analyses as we collect the remaining samples. After the initial six months of lab work, the post-doctoral researcher will help analyze the data and reconstruct pedigrees, and will begin simulation studies. Also at this time, Lacy and the post-doctoral researcher will begin working with JP Pollak to revise the genetic analysis component on the PM2000 software. After two years, we will have completed collection of lab data and modification of the software. An additional six months will be needed to finalize pedigree reconstruction, complete testing of incorporation of the new data into genetic management, and complete reports.

**Products:** Results on reconstructed pedigrees and other relationship information will be disseminated as they are produced to studbook keepers and species coordinators, so that the animals can be incorporated as soon as possible into breeding programs. Results regarding the measures of success in pedigree reconstruction, and the methods developed and tested for integrating such information into genetic management will be presented in professional meetings, such as the AZA conferences and the Society for Conservation Biology, and in journals such as *Zoo Biology*, *Animal Conservation*, and appropriate genetic or statistical publications. The enhanced Population Management software (probably to be named PM2007) will be distributed freely via the International Species Information System (ISIS) and via the web.

## 2. What are the proposed conservation methods and why are they conservationally sound?

**Conservation need and urgency:** The draft World Zoo and Aquarium Conservation Strategy (WZACS) <sup>[2]</sup> states: "Our best breeding strategies for maintaining genetic diversity have been developed for populations where relationships among individuals are known and can be calculated from complete pedigrees. However, it is difficult to apply these strategies to populations where parentage is uncertain. ... WZACS urges all zoos and aquariums to continue to support the scientific development of these fields to further refine population management, particularly for taxa held in group situations." The AZA Small Population Management Advisory Group also assigned top priority to the development of methods for genetic management of group-living species. (See attached letter of support.) While this project will provide and test methods that are directly applicable to management of animals at the group level, we also feel that it is critical to develop approaches for improving management at the intermediate levels where most of our species exist — that is, those with partly known pedigrees, with uncertain knowledge about kinships, and some unknown portions of the pedigree. We need to know when should we fall back to purely group management (and at what genetic cost), when can we use molecular techniques to fill in gaps to allow more precise management (and at what resource cost), and when we can use a mixed strategy (with what gain).

It is now the perfect time to address these needs with a concerted and coordinated effort that combines empirical data collection, test cases, theoretical development of methods, simulation testing of efficacy, and development of software tools. Recently developed methods for DNA analysis are now becoming widely used as a means to inform breeding programs, and software is now available to estimate relationships from DNA data. (See the many examples cited in the Bibliography.) Ongoing work at the Zoological Society of London (with input from Lacy and others) is providing prototype software for tracking and using partial pedigree information for group-living species. The Zoological Information Management System (ZIMS) database under development by ISIS will provide us with the ability to track partial pedigree and group-composition data for all of our species. Lacy recently added a module to the Vortex software for population viability analyses to allow for genetic management. Vortex is used to project demographic and genetic changes in a population under specified species characteristics, environmental conditions,



and management decisions<sup>[3]</sup>. With the new genetic management module, a user can now test the long-term consequences of managing a population according to a specified breeding plan (such as a precise or less precise mean kinship strategy, simple avoidance of inbreeding, or other strategies), and the effects of uncertainty in breeding performance and imprecision of genetic management can be tested. In addition, a new software package (ZooRisk), developed by colleagues at the Lincoln Park Zoo, provides similar modeling capabilities but uses different algorithms—allowing testing of some genetic management approaches on two independent simulation tools.

**Empirical studies:** DNA data can be used in several ways to provide information about uncertain pedigrees. Ideally, pedigree reconstruction involves screening a number of loci to identify alleles that allow exclusion, based on Mendelian genetics, of all but one possible sire and dam. Lacking resolvable certainty about parentage, DNA can still be used to estimate the pairwise relatedness values in a population, or can be used to identify likely parents with quantifiable probabilities. Pedigree reconstruction using DNA methods has been reported for a variety of bird and mammal species to understand the breeding structure within wild populations where history is unknown<sup>[4-9]</sup>. Both single-locus microsatellite analysis and multi-locus DNA fingerprint analysis have proven to be accurate tools for the evaluation of paternity and relatedness among individuals as well as estimating levels of variability within groups<sup>[10-15]</sup>. Mathematical models<sup>[16, 17]</sup> and paternity analysis software<sup>[18, 19, 20]</sup> are available to assist with parentage assignment (see additional references in Bibliography). The strengths of the various methods to estimate kinships from DNA data have recently been examined<sup>[11, 21]</sup>, and the usefulness of the computer programs will be evaluated further in this study by determining what percentage of known parents it can correctly identify within the population. For both species, there are some known parents and known portions of the pedigrees that will be used for this analysis.

**Ring-tailed Lemur:** There are published primers for ten microsatellite loci that appear to work in *Lemur catta*<sup>[22]</sup>. Paternity exclusions, based on 10 genotypes per individual, can often be determined directly. If these fail to resolve a relatedness question in lemurs, DNA fingerprint analysis will be used to measure the pairwise relatedness coefficients across a group of target individuals<sup>[23]</sup>. Individuals who need parentage confirmation will be identified and samples from all living individuals have been requested by the Species Coordinator and Studbook Keeper, Lynne Villers. Samples will be frozen tissues (banked at necropsy), cell lines banked at the San Diego Zoo, blood samples taken opportunistically or from banked blood, or hair with bulbs. (See attached letter of support.)

**Inca Tern:** There are no published microsatellite primers for terns, however, microsatellite primers are available for murres<sup>[24]</sup>. These will be tested for possible use with terns. In addition, multi-locus DNA fingerprinting methods, using Jeffrey's 33.6 and 33.15 chemiluminescent probes, will be used to measure pairwise band-sharing coefficients. We will also determine gender for any unsexed birds. The Population Manager and Studbook Keeper, Anne Oiler, has identified living birds for sample collection (0.20 mls blood or blood feather) and paternity analysis. For some birds (about 25%), identification of the immediate parents or grandparents will remove the individual from unknown status list. However, most birds will require a deeper pedigree analysis that might extend back to birds that are no longer alive. For those individuals, we will measure their relatedness to birds from the same colony. Band-sharing coefficients can identify first and second order relations when calibrated for Inca terns by measuring known relatives and unrelated birds. In addition, the assumption of monogamy will be tested, using DNA fingerprint analysis, by examining 10 to 12 adult pairs and their offspring from three populations that maintain well documented records (through observation).

The Brookfield Zoo's genetics lab is well equipped to undertake these DNA analyses. A 96-well gradient BioRad thermocycler will allow primer optimization to proceed rapidly. A Beckman/Coulter CEQ2000XL system performs both sequencing and fragment analysis in an 8 capillary array. Microsatellite genotyping is routinely done using this instrument for paternity analysis and population studies. Multi-locus DNA fingerprinting has been used to verify paternity and relatedness in a variety of species. Gender determination is routinely done in our lab for Inca terns.

**Theoretical explorations using analytical and simulation approaches:** Concurrent with the empirical studies of the two species, we will pursue more general analysis of the issues, using both analytical pedigree analyses and simulation methods. Questions to be answered include: What is the efficacy of improving management by resolving previously unknown parentages? How much of the pedigree needs to be known to allow for at least minimally effective management? Is there some upper level of percent known, above which the added benefit from resolving the last few parentages doesn't provide much further benefit? The questions will be explored by testing the effect of added information in genetic management with the PM2000 software program, and the further enhancements of it to be completed in this project, and also by using a new Genetic Management module of the Vortex population modeling software. With this simulation tool, population performance can be projected under various genetic management strategies, starting with pedigrees from hypothetical or existing studbooks. Using a prototype of this software, Holzer examined the effect of less than perfect management on the success of a tiger breeding program<sup>[25]</sup>. In a similar way, we will test effectiveness of management on less than perfect pedigrees.

How should we use data on animals for which the parentage is less than 100% certain? If we can narrow the possibilities of parentage, or place a probability on the likelihood of an animal being the parent, can that information be incorporated into a management plan? The methods developed by Lacy and Ballou<sup>[26, 27]</sup> for omitting missing portions of a pedigree from analysis provide a basis for pursuing this question. Just as animals with partial pedigrees are considered to be partial animals in the analyses of descendants, so can possible parents be treated as partial parents. (Allele transmission through a lineage is a probabilistic phenomenon, so there is little difference between an incomplete probability of parentage and the uncertain transmission of alleles from a certain parent.)

What is the impact of error in pedigrees on the effectiveness of our management? Some work on this has been presented by Willis<sup>[28, 29]</sup>, and Lacy has a paper in press<sup>[30]</sup> that uses simulation methods to begin exploration of this question, but more extensive testing across a range of possible cases is needed. The newly enhanced Vortex simulation software is ideally suited to examine population projections under various assumptions of population structure, genetic management approach, and the extent and accuracy of population information.

How should we use information on animals for whom we know recent ancestry (e.g., parents, grandparents), but are missing information from deeper ancestry? Currently, pedigree analyses exclude completely animals for whom no ancestry can be traced back to the wild-caught founders. However, this often results in ignoring known relationships and non-zero levels of inbreeding, for example, when an animal is the offspring of a brother-sister pair who themselves descend from unknown ancestors. Because a known relationship or level of inbreeding will be ignored if it resides in a part of the pedigree that descends from unknown ancestors, decisions on breeding recommendations are now based solely on the part of the pedigree that can be traced further back, perhaps giving an overly optimistic view of the genetic values of some breeders. We need to develop analytical methods that do not assume that those portions of a pedigree that can not be fully traced will mirror the known portions on which we currently base all analyses. One way to do this might be to assign founder status to unknown ancestors whenever it would reduce assessed genetic value, but we need to know if this will improve overall genetic management, and new tools will be needed to facilitate such an approach. As we add features to PM2000, we will be able to test the benefits gained — in terms of improved retention of genetic diversity — from the new approaches.

**Software development:** An important component of this project is the revision of the genetic section of the PM2000 software used to guide AZA breeding programs. Changes that are planned for the studbook database software (the new ZIMS), and new programming platforms and operating systems (.NET and newer Windows), will soon leave PM2000 as an orphan program, unable to use the latest data and unable to operate fully on modern computer systems. (For example, the Templated Report feature in PM2000 is now unable to work with many versions of MS Word). PM2000 will be rewritten (turned into PM2007) to function with ZIMS, to accept the data from ZIMS on uncertain and group pedigrees, to more smoothly incorporate DNA-based relatedness information into pedigree analyses, and to incorporate new techniques developed in the above studies. The cost and time to produce this enhanced tool will be minimal compared to what would be needed if we were to start from scratch, because of the prior work by Lacy and contract programmer Pollak on GENES, PM2000, Vortex, and other programs for management and research.

### 3. What is the object that is the focus of this project?

This study focuses on improving pedigree analysis and management in cases of incomplete pedigree records. Thus it will potentially benefit all of the species held in zoos for which pedigrees are incompletely known. The AZA has recently proposed eliminating the PMP category of management, moving each current PMP species either into the fully managed SSP category or removing it from formal cooperative management. Most PMP species have highly incomplete pedigrees. How many of these species can be moved to SSP status, and how effectively they can be managed, will be critically determined by whether we have good methods for improving the level of knowledge we have about the pedigrees, and for using incomplete pedigree information to guide management.

We will use two species in need of such attention as specific test cases:

**Ring-tailed lemur (*Lemur catta*) (SSP).** Brookfield Zoo has 5 ring-tailed lemurs. Currently, 85 institutions in North America hold this species, but 70% of the 470 individuals have been removed from breeding consideration due to unknown pedigrees. The SSP Coordinator and Studbook Keeper has identified this project as important for allowing population management of the species. Fortunately, good institutional records on who was present in a given population at the time of each conception and birth will greatly facilitate the reconstruction of parentages using DNA data. Thus, the large number of unknowns do not constitute a single, impossibly complex “black box” for analysis, but rather are partitioned into a number of manageable units likely amenable to resolution by using DNA methods.

**Inca tern (*Larosterna inca*) (PMP).** Brookfield has a breeding colony of 27 Inca terns. Currently, 23 institutions hold colonies of Inca terns, but 44% of the 250 individuals have been excluded from the breeding population due to

unknown pedigrees. This affects breeding populations at 18 institutions where managers must hold the non-breeding individuals away from the breeding pairs part of the time, taking up valuable space, or pull eggs from undesirable pairs, a practice that wastes gametes from the partner who may be more valuable genetically. Extra-pair fertilizations, documented in some <sup>[31]</sup>, but not other <sup>[32]</sup>, species of colonial nesting birds, are a possibility in these birds.

#### **4. How does the project relate to your museum's ongoing conservation activities?**

Brookfield Zoo participates in 32 SSPs, and publishes two international and three regional studbooks, including the studbook for Inca terns. The zoo supports the genetic research done on-site in a lab that was partially funded by an IMLS grant in 1989. Genetic services have been made available free of charge to all AZA institutions. Since September 1989, the lab staff have processed chromosome and DNA requests from 168 institutions. Dr. Dubach was recently recognized by the AZA for the outstanding service provided by her lab to AZA breeding programs.

An IMLS grant was awarded in 1994 that provided resources to identify species and subspecies and possible hybrids as well as study the taxonomy of the New World primate genera of *Ateles* and *Aotus*. This work led to a taxonomic revision of the genus *Ateles* <sup>[37, 38, 39]</sup> and an analysis of 309 captive primates from 68 institutions in North America. That work continues today, as the number of primates examined has grown to 697. The IMLS grant awarded in 1998 allowed us to evaluate genetic diversity in the captive population of the endangered Humboldt penguin and compare that population with an extensive sampling of wild penguins. We were also able to test basic assumptions made during pedigree analysis for this species, such as founder origin and relatedness, monogamy, loss of genetic variability, and homogeneity of the wild source population. Results showed that this species did not violate any of the assumptions and had been managed very successfully. We have also determined gender for over 2,000 captive and wild penguins.

Our 2002 IMLS CP grant was awarded to study the effects of generations of captive management on experimental populations of *Peromyscus leucopus* mice. The results from this study (to be completed in June 2005) will experimentally test for the first time the effects of zoos' standard genetic management plans on genetic diversity at neutral and adaptively important loci, on quantitative genetic variation in morphological traits, on behavioral adaptations to captivity, on stress hormones, and on changes in nutritional physiology. The zoo has, for almost 20 years, used *Peromyscus* mice as models to test effects of breeding systems <sup>[33-36]</sup>, and future studies at the zoo could exploit this system to provide detailed empirical tests of methods we develop in this study for managing uncertain pedigrees.

#### **5. What are the anticipated benefits of this project?**

First, this study will help us evaluate the utility of using molecular tools as a regular component of population management planning. Can molecular methods resolve these difficult questions with enough detail to be helpful and should they be applied on a routine basis? Which software programs provide the most accurate results, how can computer modeling assist with this process? The data will provide excellent test cases to help answer these questions. Second, as many individuals as possible from each taxon will be returned to the breeding population by resolving their pedigrees. Long-term projections of gene diversity are based on multiple parameters, one of which is population size. The quickest and most cost-effective means to increase N may often be to resolve unknown or uncertain pedigrees. Additional gains in retention of diversity will result if individuals added to the population represent rare founder lines. Although the costs of molecular analysis are considerable, the expenses are far less than would be required to double the size of managed breeding populations through increasing cages and all else that is required to add animals.

A recent analysis of the captive population of ring-tailed lemurs by PMC biologists showed that 70% of this population cannot be used for breeding. Many of these animals might be valuable genetically and occupy limited space in zoos. Therefore, resolving pedigrees for any of these lemurs increases the available gene diversity and likelihood of successful management of the population. Currently, with a population size of 137 individuals, 90% gene diversity will be retained for 34 years. With 391 individuals in the breeding population, that would be increased to 72 years.

While "only" 44% of the Inca tern population has been removed from breeding, terns are colonial, and management of non-breeding individuals can be difficult. Either the birds are removed from the main colony, requiring additional holding space, or eggs must be removed. Again, returning individuals to the breeding group increases the productive segment of the population and maintenance of genetic diversity overall. This species may be elevated to an SSP species (K. Smith, pers. comm.) once pedigree reconstruction has been completed.

Breeding recommendations are based on the assumption that the terns are monogamous. Studies of colonial breeders report various levels of extra-pair fertilizations <sup>[9, 12, 31, 32]</sup>. Extra-pair fertilizations can severely change the outcome of breeding recommendations; testing the assumption of monogamy is important for managing this species.



**6. How will the applicant ensure that ongoing museum functions are not inhibited?**

The Department of Conservation Biology at the zoo was established in 1985 to conduct basic and applied research of conservation importance. Although some of the research is conducted on animals in the zoo's collection, the department's resources and activities are distinct from management of other zoo operations. The genetics program is funded by the Chicago Zoological Society and is charged with serving the needs of Brookfield Zoo and other AZA institutions. This project is consistent with that mission, and ongoing service work and research projects will continue without disruption. Institutional resources devoted to the match for this grant consist primarily of support for regular staff who would be assigned to other, lower priority, projects if this proposal is not funded.

Obtaining blood samples from lemurs or terns will not disrupt activities of participating institutions as they will be taken opportunistically as part of routine physical exams or when collections are moved between outdoor and indoor facilities. This proposal has been approved by the institution's Biological Research Steering Committee, which determined that the opportunistic sampling does not require review by the zoo's IACUC.

**7. How does the project budget support the project goals and objectives?**

We ask that IMLS consider this to be an "exceptional project" due to its impact on zoos' population management practices. Funds requested in this proposal will cover a portion of Dubach's time, materials needed for DNA fingerprint and PCR-based microsatellite analysis, and additional staff to necessary to complete the project. The ring-tailed lemur pedigree analysis will be done primarily using microsatellites. Estimates for materials are based on a maximum of 10 loci for every individual in the living population (470), adjusted for the assumptions that we will not receive samples from every living individual and that we will analyze all currently banked samples from deceased animals. Materials were estimated to allow for some repetition to enable verification of genotype scoring. The Inca tern pedigree analysis will be done primarily using multilocus DNA fingerprint methods. Thirty gels (18 individuals each) will be needed to cross-reference all individuals in the living population. The probes are Jeffery's 33.6 and 33.15 with a chemiluminescent label, visualized on X-Ray film (2 films per gel per probe). A full-time research assistant will be needed for 2 years to extract DNA, do PCR reactions for microsatellites, and prepare DNA restriction digests for DNA fingerprinting, vacuum blotting DNA and probing and analysis of microsatellites and fingerprint data. A full-time post-doctoral assistant will be needed for 2 years to assist with statistical analysis of DNA data, conduct the simulation studies, develop new algorithms for pedigree analysis methods, guide software development, and test and document new software.

**8. What are the qualifications and responsibilities of the project personnel?**

1) Dr. Jean Dubach will supervise lab operations including accessioning samples, DNA extraction, PCR and fingerprint procedures and genotyping, data analysis, and reports. Dubach manages the genetic lab and has provided genetic analysis to 168 institutions for 60 bird, 40 mammal, and 2 reptile species. These analyses include sexing birds ( $n = 2,613$ ), taxonomic identification (697 primates), chromosome screening (321 individuals), and paternity analysis for 17 taxa.

2) Stacy Schultz will help oversee lab procedures and data collection. Schultz has been a research associate in the genetics lab for 10 months and is familiar with all lab procedures. One quarter time will be devoted to this study.

3) Randy Thompson manages the lab databases. He will devote 15% effort to track samples as they come into the lab and DNA samples as they are extracted. He will also enter the genetic data into a database for analysis.

4) A full-time research assistant is needed to perform the considerable lab work (buffers, PCR, DNA extractions, fingerprinting) required for this study. To be hired for two years.

5) Dr. Robert Lacy helped develop many of the pedigree analysis methods that are now used to manage almost all zoo breeding programs. Lacy wrote the GENES software that first implemented many of the current methods, and he designed the genetic module of the PM2000 software that is now in use. He wrote the Vortex software for population viability analysis, and has extensively used simulation methods to test genetic management techniques. He taught the genetics section of the AZA Population Management course, and was an instructor in the training classes for the AZA's Small Population Management Advisory Group. Lacy will work with and supervise the postdoctoral researcher, and will work with JP Pollak on the revisions to population management software.

6) A full-time postdoctoral fellow will be hired to carry out the simulation studies, assist Lacy with further developing the analytical framework for methods, help guide software development, and conduct extensive testing and documentation of the new software. The qualifications will include a Ph.D. in population genetics or a closely related field and familiarity with programming and simulation methods.

**CHICAGO ZOOLOGICAL SOCIETY  
PEDIGREE RECONSTRUCTION TO SUSTAIN ZOO POPULATIONS**

Research Activity			2005				2006				2007			
	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
<b>Sample Collection</b>														
Lemur														
Tern														
<b>Molecular Genetics</b>														
Genotype Individuals -- Lemur														
Fingerprint Work -- Tern														
<b>Data Analysis</b>														
<b>Statistical Analysis</b>														
<b>Dissemination of Results</b>														

# Project Budget Form

## SECTION 2: CONSERVATION DETAILED BUDGET

Year ☒ 1 ☐ 2 ☐ 3 - Budget Period from 7 / 1 / 05 to 6 / 30 / 06

Name of Applicant Organization Chicago Zoological Society

IMPORTANT! READ INSTRUCTIONS ON PAGES 3.3-3.5 BEFORE PROCEEDING.

### SALARIES AND WAGES (PERMANENT STAFF)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
	( )	40% x \$65,779	10,525	15,787	26,312
	( )	10% x \$83,674		8,367	8,367
	( )	25% x \$30,379		7,595	7,595
	( )	15% x \$30,379		4,557	4,557
TOTAL SALARIES AND WAGES			\$ 10,525	36,306	46,831

### SALARIES AND WAGES (TEMPORARY STAFF HIRED FOR PROJECT)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Post Doc	(1)	100% x \$40,000	20,000		20,000
Research Assistant	(1)	100% x \$29,494	29,494		29,494
	( )				
	( )				
TOTAL SALARIES AND WAGES			\$ 49,494		49,494

### FRINGE BENEFITS

RATE		SALARY BASE	IMLS	APPLICANT	TOTAL
28	% of \$	34,679		9,710	9,710
7.65	% of \$	12,152		930	930
28	% of \$	49,494		13,858	13,858
TOTAL FRINGE BENEFITS			\$	24,498	24,498

### CONSULTANT FEES

NAME/TYPE OF CONSULTANT	RATE OF COMPENSATION (DAILY OR HOURLY)	NO. OF DAYS (OR HOURS) ON PROJECT	IMLS	APPLICANT	TOTAL
TOTAL CONSULTANT FEES			\$		

### TRAVEL

FROM/TO	NUMBER OF: PERSONS DAYS	SUBSISTENCE COSTS	TRANSPORTATION COSTS	IMLS	APPLICANT	TOTAL
	( ) ( )					
	( ) ( )					
	( ) ( )					
	( ) ( )					
TOTAL TRAVEL COSTS				\$		

# Project Budget Form

## SECTION 2: CONSERVATION DETAILED BUDGET CONTINUED

 Year ☒ 1 ☐ 2 ☐ 3

### MATERIALS, SUPPLIES AND EQUIPMENT

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
see attached detail				
<b>TOTAL COST OF MATERIALS, SUPPLIES, &amp; EQUIPMENT</b>		\$ 23,096	2,507	25,603

### SERVICES

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Software rewrite	\$30/hour x 500 hours = .5 yr	7,500		7,500
CEQ maintenance	annual cost		3,570	3,570
<b>TOTAL SERVICES COSTS</b>		\$ 7,500	3,570	11,070

### OTHER

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Beckman Sequencer	depreciation		15,307	15,307
Samples	183 samples x \$5 storage		915	915
<b>TOTAL OTHER COSTS</b>		\$	16,222	16,222

<b>TOTAL DIRECT PROJECT COSTS</b>	\$ 90,615	83,103	173,718
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### INDIRECT COSTS

Check either item A or B and complete C. (See section on Indirect Costs, pages 3.4-3.5.)

Applicant organization is using:

- ☐ A. An indirect cost rate which does not exceed 15 percent of modified total direct costs charged to IMLS.  
☒ B. Federally negotiated indirect cost rate (see pages 3.4-3.5).

National Science Foundation

Name of Federal Agency

none

Expiration Date of Agreement

Rate base amount

31 % of \$ 52,895 = \$ 16,397

IMLS

APPLICANT

TOTAL

**C. TOTAL INDIRECT COSTS**

\$

16,397
7934



# Project Budget Form

## SECTION 2: CONSERVATION DETAILED BUDGET

Year ☐ 1 ☒ 2 ☐ 3 - Budget Period from 7 / 1 / 06 to 6 / 30 / 07

Name of Applicant Organization Chicago Zoological Society

IMPORTANT! READ INSTRUCTIONS ON PAGES 3.3-3.5 BEFORE PROCEEDING.

### SALARIES AND WAGES (PERMANENT STAFF)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
	( )	40% x \$67,753	10,840	16,261	27,101
	( )	10% x \$86,184		8,618	8,618
	( )	25% x \$31,291		7,823	7,823
	( )	15% x \$31,291		4,694	4,694
TOTAL SALARIES AND WAGES			\$ 10,840	37,395	48,236

### SALARIES AND WAGES (TEMPORARY STAFF HIRED FOR PROJECT)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Post Doc	(1)	100% x \$41,200	41,200		41,200
Research Assistant	(1)	100% x \$30,379	30,379		30,379
	( )				
	( )				
TOTAL SALARIES AND WAGES			\$ 71,579		71,579

### FRINGE BENEFITS

RATE		SALARY BASE	IMLS	APPLICANT	TOTAL
28	% of \$	35,720		10,001	10,001
7.65	% of \$	12,516		957	957
28	% of \$	71,579		20,042	20,042
TOTAL FRINGE BENEFITS			\$	31,001	31,001

### CONSULTANT FEES

NAME/TITLE OF CONSULTANT	RATE OF COMPENSATION (DAILY OR HOURLY)	NO. OF DAYS (OR HOURS) ON PROJECT	IMLS	APPLICANT	TOTAL
TOTAL CONSULTANT FEES			\$		

### TRAVEL

FROM/TO	NUMBER OF PERSONS	DAYS	SUBSISTENCE COSTS	TRANSPORTATION COSTS	IMLS	APPLICANT	TOTAL
	( )	( )					
	( )	( )					
	( )	( )					
	( )	( )					
TOTAL TRAVEL COSTS					\$		

# Project Budget Form

## SECTION 2: CONSERVATION DETAILED BUDGET CONTINUED

 Year ☐ 1 ☒ 2 ☐ 3

### MATERIALS, SUPPLIES AND EQUIPMENT

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
TOTAL COST OF MATERIALS, SUPPLIES, & EQUIPMENT \$		_____	_____	_____

### SERVICES

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Software rewrite	\$30/hour x 500 hours = .5 yr	7,500	_____	7,500
CEQ maintenance	annual cost	_____	3,749	3,749
_____	_____	_____	_____	_____
TOTAL SERVICES COSTS		\$ 7,500	3,749	11,249

### OTHER

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Samples	183 samples x \$5 storage	_____	915	915
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
TOTAL OTHER COSTS		\$ _____	915	915

TOTAL DIRECT PROJECT COSTS	\$ 89,919	73,060	162,979
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### INDIRECT COSTS

Check either item A or B and complete C. (See section on Indirect Costs, pages 3.4–3.5.)

Applicant organization is using:

- ☐ A. An indirect cost rate which does not exceed 15 percent of modified total direct costs charged to IMLS.  
☒ B. Federally negotiated indirect cost rate (see pages 3.4–3.5).

National Science Foundation

Name of Federal Agency

none

Expiration Date of Agreement

Rate base amount

\_\_\_\_\_ 31 % of \$ 12,164 = \$ 3,771

	IMLS	APPLICANT	TOTAL
C. TOTAL INDIRECT COSTS	\$ _____	3,771	1,096

# Project Budget Form

## SECTION 2: CONSERVATION DETAILED BUDGET

Year ☐ 1 ☐ 2 ☒ 3 - Budget Period from 7 / 1 / 07 to 12 / 31 / 07

Name of Applicant Organization Chicago Zoological Society

IMPORTANT! READ INSTRUCTIONS ON PAGES 3.3-3.5 BEFORE PROCEEDING.

### SALARIES AND WAGES (PERMANENT STAFF)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
	( )	40% x \$69,785	5,583	8,374	13,957
	( )	10% x \$88,770		4,438	4,438
	( )	25% x \$32,229		4,029	4,029
	( )	15% x \$32,229		2,417	2,417
TOTAL SALARIES AND WAGES			\$ 5,583	19,259	24,841

### SALARIES AND WAGES (TEMPORARY STAFF HIRED FOR PROJECT)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Post Doc	(1)	100% x 42,436	21,218		21,218
	(1)				
	( )				
	( )				
TOTAL SALARIES AND WAGES			\$ 21,218		21,218

### FRINGE BENEFITS

RATE	SALARY BASE	IMLS	APPLICANT	TOTAL
28 % of \$	18,396		5,151	5,151
7.65 % of \$	6,446		493	493
28 % of \$	21,218		5,941	5,941
TOTAL FRINGE BENEFITS		\$	11,585	11,585

### CONSULTANT FEES

NAME/TYPE OF CONSULTANT	RATE OF COMPENSATION (DAILY OR HOURLY)	No. OF DAYS (OR HOURS) ON PROJECT	IMLS	APPLICANT	TOTAL
TOTAL CONSULTANT FEES			\$		

### TRAVEL

FROM/TO	NUMBER OF: PERSONS DAYS	SUBSISTENCE COSTS	TRANSPORTATION COSTS	IMLS	APPLICANT	TOTAL
AZA Conf.	(3) (6)	1440	600	480	1560	2040
SPMAG Conf.	(3) (4)	960	600	320	1240	1560
	( ) ( )					
	( ) ( )					
TOTAL TRAVEL COSTS				\$ 800	2800	3600

# Project Budget Form

## SECTION 2: CONSERVATION DETAILED BUDGET CONTINUED

 Year ☐ 1 ☐ 2 ☒ 3

### MATERIALS, SUPPLIES AND EQUIPMENT

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
TOTAL COST OF MATERIALS, SUPPLIES, & EQUIPMENT \$		_____	_____	_____

### SERVICES

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
TOTAL SERVICES COSTS \$		_____	_____	_____

### OTHER

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
AZA Registration	\$400 x 3 = 1200	400	800	1200
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
TOTAL OTHER COSTS \$		400	800	1200

TOTAL DIRECT PROJECT COSTS	\$ 28,000	34,444	62,444
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### INDIRECT COSTS

Check either item A or B and complete C. (See section on Indirect Costs, pages 3.4-3.5.)

Applicant organization is using:

- ☐ A. An indirect cost rate which does not exceed 15 percent of modified total direct costs charged to IMLS.  
☒ B. Federally negotiated indirect cost rate (see pages 3.4-3.5).

National Science Foundation

Name of Federal Agency

none

Expiration Date of Agreement

Rate base amount

\_\_\_\_\_ 31 % of \$ \_\_\_\_\_ 4,800 = \$ \_\_\_\_\_ 1,488

	IMLS	APPLICANT	TOTAL
C. TOTAL INDIRECT COSTS	\$ _____	1,488	517



# Project Budget Form

## SECTION 1: SUMMARY BUDGET, CPS AND EDUCATION COMPONENTS

Name of Applicant Organization Chicago Zoological Society

IMPORTANT! READ INSTRUCTIONS ON PAGES 3.3-3.5 BEFORE PROCEEDING.

### DIRECT COSTS

	IMLS	Applicant	Total
SALARIES & WAGES	<u>169,239</u>	<u>92,960</u>	<u>262,199</u>
FRINGE BENEFITS	<u></u>	<u>67,084</u>	<u>67,084</u>
CONSULTANT FEES	<u></u>	<u></u>	<u></u>
TRAVEL	<u>800</u>	<u>2,800</u>	<u>3,600</u>
MATERIALS, SUPPLIES & EQUIPMENT	<u>23,096</u>	<u>2,507</u>	<u>25,603</u>
SERVICES	<u>15,000</u>	<u>7,319</u>	<u>22,319</u>
OTHER	<u>400</u>	<u>17,937</u>	<u>18,337</u>
<b>TOTAL DIRECT COSTS</b>	<b>\$ <u>208,535</u></b>	<b>\$ <u>190,607</u></b>	<b>\$ <u>399,142</u></b>
<b>INDIRECT COSTS</b>	<b>\$ <u></u></b>	<b>\$ <u>14,197</u></b>	<b>\$ <u>21,656</u></b>
<b>TOTAL PROJECT COSTS</b>	<b>\$ <u>420,798</u></b>		

AMOUNT OF CASH-MATCH \$ 194,056

AMOUNT OF IN-KIND CONTRIBUTIONS \$ 18,207

TOTAL AMOUNT OF MATCH (CASH & IN-KIND CONTRIBUTIONS) \$ 204,804

AMOUNT REQUESTED FROM IMLS, INCLUDING INDIRECT COSTS \$ 208,535

PERCENTAGE OF TOTAL PROJECT COSTS REQUESTED FROM IMLS 50 %  
(MAY NOT EXCEED 50%)

Have you received or requested funds for any of these project activities from another federal agency?  
(Please check one) ☐ Yes ☒ No

If yes, name of agency \_\_\_\_\_

Request/Award amount \_\_\_\_\_

**University of North Carolina, North Carolina Botanical Garden**  
Chapel Hill, North Carolina

Project Type: Detailed Survey

IMLS Award: \$57,646

Match: \$78,226

Total Project: \$135,872

Museum Budget: \$1,457,377

\$57,646 to conduct a detailed condition survey of Battle Park, a 93-acre wooded park of conservation, historic and recreational value, to describe and identify the magnitude of current conservation problems and to create a guide for future conservation activities.

## 1. WHAT IS THE DESIGN OF THE PROJECT?

The goal of this project is to conduct an eighteen month general condition survey of the 93-acre Battle Park, acquired by the North Carolina Botanical Garden in July 2004, in order to describe current conditions, identify the magnitude of current conservation problems, and create a guide to future conservation activities. Battle Park is an exemplary natural area and an historic tract with recreational trails. The Park's woodlands predate both the University (1793) and European settlement in Chapel Hill (1742). The tract has received little attention from the University of North Carolina in the last several decades. In addition, Hurricane Fran (1996) caused some tree fall, left hazard trees by trails, and contributed to trail and stream erosion. These disturbances, in turn, increased the rate of invasive exotic plant establishment. In order to best protect and restore this important tract, as well as identify trees that pose a hazard to visitor safety, we seek to conduct an assessment of its current condition, including the location and boundaries of older woodland patches, the location of hazard trees, the identity and location of rare or threatened species, and the location and size of exotic plant infestations. The work will enhance the long-term value of the tract for teaching, research, interpretation, and educational programs.

As a conservation garden, the North Carolina Botanical Garden is committed to protecting, restoring, and presenting plant diversity and natural areas to the public for research, education, contemplation, and quiet recreation. We present the full spectrum from human gardens to nature's own gardens on lands that now total 800 acres. Through our mission (readopted in 2004), strategic plan (adopted in 2004), and policies our most important goal is to understand and conserve native plants, restore natural areas, and remove invasive exotic species. We have extensive experience with natural areas as part of our collections, including the Nature Trails, Coker Pinetum, Hunt Arboretum, Mason Farm Biological Reserve, and seven nature preserves. Battle Park is the latest jewel in this system of important outdoor spaces and we are eager to integrate this property with the rest of our programs. We were given \$150,000 for trail restoration and have also been give a new full-time position to support this new responsibility; by the time the proposed project proposed is initiated, the trail restoration work will have been completed.

We divide our work into eight tasks (see also the attached project schedule):

**Task 1.** May 2005 to July 2005. Assemble background information on the topography, soils, and history of Battle Park. Garden staff member, Stephen Keith, Curator of Battle Park, will obtain paper and digital copies of all maps of Battle Park from the University's Facilities Planning and Design office. Digital maps will be assembled in a Geographic Information System database using ArcView. Stephen Keith will also conduct research in the North Carolina collection at Wilson Library to synthesize available information on the history of Battle Park, including obtaining copies of historic photos. The historic information will generate observations for further investigation in the field and will create base maps for later work; thus, it must be initiated early in the project.

**Task 2.** May 2005 to June 2005. Database all existing plant specimens collected from the Battle Park Tract and held at the University of North Carolina Herbarium. Our goal here is to capture and understand the knowledge from past research on this tract. Although there were no extensive surveys, the tract has been within walking distance of the University since its inception. Several leading botanists (William Coker, Henry Totten, and John Couch) are

known to have collected occasional specimens there. This survey will be conducted by existing Garden staff member Carol Ann McCormick, Assistant Curator of the Herbarium. Information on the specimens discovered will be computerized using the NSF-supported standard database program, SPECIFY. Specimens in the UNC Herbarium are segregated by state and county, thereby facilitating this search. All identifications will be verified by Alan Weakley, Curator of the Herbarium. In subsequent field work (Task 3) we will evaluate whether the species continue to occur within the tract. This task will investigate historic information and will create lists of plants for field verification; thus, it must take place early in the project.

**Task 3.** May 2005 to June 2006. Conduct a field survey of the plants of Battle Park, record locations with a GPS unit, create herbarium specimens to documents all currently undocumented species, and database all new records. The temporary botanist (a position to be hired with these grant funds) will be responsible for field work throughout the year in order to document the flora in every season and to visit all parts and habitats of the tract. The temporary botanist will be in weekly contact with the staff members accomplishing Task 2 and will seek to verify records discovered in the search of existing herbarium specimens. Alan Weakley, Curator of the Herbarium, will review all herbarium specimens. The field work must be carried out in all seasons (our flowering season is nearly 12 months long, with early spring wildflowers sometimes out in February and other species blooming into December) in all habitats and thus has been scheduled for one year, with a month's overlap to account for possible year to year variation. Evergreen species, including invasive species like Oregon grape and English ivy, can be searched easily in the winter months.

**Task 4.** August 2005. Create and monument a regular reference grid in the field using GPS units in order to create the basis for finer-scale mapping of older woodland area; hazard trees; large trees; exotic plant infestations; and rare plant species. The temporary botanist will work with Garden staff member Stephen Keith, the Curator of Battle Park, to establish this grid, with points marked with PVC stakes and mapped from witness trees and other landmarks. Grid points will be established on a 25 m x 25 grid, as we have done at the Mason Farm Biological Reserve. We have extensive experience with establishing and maintaining research grids of this type. GPS-technology adds to the redundancy built into the system. This project has been scheduled early in the project so that its results can be used in later tasks.

**Task 5.** September 2005 to November 2005. July 2006. Using the reference grid and GPS units, we will create a finer-scale map for rare plants, hazard trees, large trees, and significant landscape features (like springs and evidence of past human use). This work will be done with the temporary botanist working with Garden staff member Stephen Keith, Curator of Battle Park. All hazard trees will be evaluated by Stephen Keith and prioritized for the removal of whole trees or limbs. The first mapping exercise will be carried out in the Fall of 2006, with follow-up the following summer to add locations discovered during subsequent field work. Depending on season of detectability, some rare species may have to be mapped in other months.

**Task 6.** December 2005 to February 2006. July 2006. Assess the checklist created in Task 1 and Task 2 against lists of national, statewide, and regional rare species in order to evaluate the need for protection of threatened species and against lists of exotic and invasive species



in order to evaluate the highest priority areas for restoration. We will check the plant checklist against several databases in order to verify rarity, exotic status, and invasiveness. These include: USDA PLANTS, the Floristic Synthesis of the Biota of North America Program, the North Carolina Natural Heritage Program, and the North Carolina Chapter of the Southeastern Exotic Plant Pest Council. This work will be carried out by the temporary botanist as records and specimens accumulate during field work. We will initiate this work after the first field season and complete it after the Spring survey in the second year.

**Task 7.** July 2006 to September 2006. Using GPS and the reference grid, we will map locations of all invasive exotic plant species. For some species (for example, *Mahonia beadleii*, the Oregon Grape), these will be point data for the location of individual stems. For other species (for example, *Hedera helix*, the English Ivy) we will mark the periphery of the patches in order to map the infestation. This work will be carried out by Garden staff member Stephen Keith, Curator of Battle Park, and the temporary botanist. All exotic invasive plant locations will be prioritized for future management. We will GPS locations of exotic invasives as they are observed during Task 3 and will devote this period at the end of the project to complete a map, including the large patches of species like English ivy and Chinese privet.

**Task 8.** September 2006 to October 2006. Complete and document all databases and maps, assessments of rarity and invasive status, and write a report that fully documents all activities of the project and makes recommendations for future work. This will be completed by Stephen Keith, Curator of Battle Park, and the temporary botanist. We have created a database of regional plant diversity and all records will be entered into that database and be available on our web site. This is the last phase of the project in which all activities are documented and archived, with a bound copy placed in the University and Garden libraries.

Because this tract is a new part of the Garden and this work is so critical, we will be able to devote the time of our new employee, the Curator of Battle Park, to this project for 80% time over the 18 month duration of the project. Garden Director Peter White, a plant ecologist with substantial experience in the flora and vegetation of the area, will meet with project staff and supervise overall progress for a commitment of eight hours per month or 2.5% of his time. Assistant Curator of the Herbarium Carol Ann McCormick will commit 5% of her time for the initial computerization of historic specimens during the first three months of the project and for help with the database for the remaining months. Curator of the Herbarium Alan Weakley will commit 5% of his time to the review of herbarium specimens and other consultations with the temporary botanist.

Products of the work will include written reports that document all activities (checklists of plants, printouts of herbarium label data, assessments of rare species and exotic species), maps with locations of rare species, exotic invasive plants, and other significant features, and databases made accessible on the Garden's web site.

## **2. WHAT ARE THE PROPOSED CONSERVATION METHODS AND WHY ARE THEY CONSERVATIONALLY SOUND?**

We will use the protocols and database systems that we have tested in previous work. All herbarium label data and other field records will be stored in SPECIFY, an NSF-supported

museum research tool developed at the University of Kansas and now fully implemented in our herbarium. Identification of specimens will be verified by our staff member Alan Weakley one of the leading experts on plants in the Southeast. We have established field reference grids on all of our other natural areas using a system that incorporates redundancy (labeled PVC stakes, witness trees with tree tags, and GPS readings within 3 m of the field location). This grid and GPS units will allow us to create an accurate base map of the locations of the various features to be mapped. We have compiled lists of exotic invasive plants and regionally rare species and have built a list of important web sites for reference. We will assess the conservation status of species using the best knowledge available. Project director Peter White serves on the Board of the state's Plant Conservation Program and Curator Alan Weakley is chair of the Scientific Committee of that program. We have developed a hazard tree rating system that has been successfully used on our Nature Trails.

### **3. WHAT IS THE OBJECT(S), HISTORIC STRUCTURE(S), OR SPECIMEN(S) THAT IS THE FOCUS OF THIS PROJECT?**

Battle Park is a 93-acre tract of woodland in the center of the Town of Chapel Hill and adjacent to the University of North Carolina campus. The Piedmont of North Carolina has long been affected by human activities, first by Native Americans and, after 1700, by European settlement. While no pristine forests remain, some woods are "forests of continuity" because although individual trees were cut for firewood and lumber, the land was always a forest back through Native American times. Such tracts were never cleared all at once nor plowed. Forests of continuity are dominated by old hardwood trees in a landscape of younger forests. They are the most important habitats for wildlife species that are sensitive to habitat fragmentation and for forest biodiversity in general, including wildflower species like Catesby's Trillium. This importance has been documented in a recent report to the Orange County Commissioners and has been discussed in a regional conservation plan called the Triangle Greenprint. The North Carolina Botanical Garden protects some of the finest mature hardwood forests in its land holdings. The Battle Park tract is thus of great significance to conservation in our fast developing region. It is also beloved of many citizens of Chapel Hill (Chapel Hill has been called a city "with a forest at its heart"), supports quiet recreation for the students, faculty and staff of the University, and is significant in the University's history.

Kemp Plummer Battle, who became president of the University in the late 1800s, grew up on the edge of the woods that were later named for him. He developed an early trail system and named many features, including old trees (the "monarch of the forest"), springs, and other features. Well-loved by citizens and neighbors, and used for nature study, university class field trips, quiet contemplation, and quiet recreation (walking, jogging), this forest has received little attention in the last several decades. Hurricane Fran (1996) caused tree damage and trail and stream erosion. In recognition of its roll in protecting, restoring, and managing University lands for research and teaching, the tract was transferred to the University's North Carolina Botanical Garden in 2004. The University also presented the Garden with a new position, Curator of Battle Park, and a budget to initiate the work to restore the trails and enhance the value for teaching, research, and quiet recreation. While seeking to protect and restore the forest we also seek to enhance current uses and pursue the concept of an "ecological observatory" with easy access from the University and community.

#### **4. HOW DOES THE PROJECT RELATE TO YOUR MUSEUM'S ONGOING CONSERVATION ACTIVITIES?**

This work will bring our newest tract to the same level of information as the other natural area tracts that we manage and allow us to proceed with the same level of conservation activity in all of our lands and collections. The Garden has established programs and policies that will be directly guide this project, including the database system for herbarium specimen information, a computer-based mapping system, collections policy, and exotic plant policy. The project will fully document our holdings and thus increase the completeness of our plant records. The project will allow us to evaluate this collection relative to our collections policy, which will allow us to schedule appropriate actions such as restoration and removal of hazard trees. We will document and map all locations of invasive plant species, as well as national, state, and regional rare plants. We have created a database for the plant diversity of our region. Data collected here will add to the value of that database and we will make the database accessible on the world wide web. One of our institution-wide goals is to be a model conservation garden; this project will allow us to fulfill this goal in our newly acquired tract by integrating our activities with ongoing conservation programs. In recognition of our past efforts, our conservation program received a Program Excellence Award from the American Association of Botanical Gardens and Arboreta in 2004.

#### **5. WHAT ARE THE ANTICIPATED BENEFITS OF THIS PROJECT?**

This project will provide the essential data and understanding that will be the basis of the Garden's future work and educational programming on this tract. Based on this work we will proceed to remove hazard trees, schedule invasive exotic plants for removal, and ensure that rare species are monitored. We will have a better understanding for the development of education programs for University students and the public. The reference grid established will facilitate the annual inventory and assessment of trail condition and hazard trees and be available as the basis of future student research projects.

#### **6. HOW WILL THE APPLICANT ENSURE THAT ONGOING MUSEUM FUNCTIONS ARE NOT INHIBITED BY THESE PROJECT ACTIVITIES?**

We are fortunate: the University created for us a new full-time position, the Curator of Battle Park. The new position was filled in September, 2004. This means that we can devote 80% of a fulltime position to this work. Thus, because we have just started our activities on this tract, the main bulk of our own work and coordination of the temporary botanist's work will not take any time away from ongoing museum functions. We will also commit important but a limited amount of time from additional staff members so that the considerable experience and expertise of the Garden staff can help guide this project. Because this is such a high priority to us, we have identified these activities in our Strategic Plan. The activities do not change any job functions, merely create a focus on the new tract. We anticipate no impact on ongoing functions.

## **7. HOW DOES THE PROJECT BUDGET SUPPORT THE PROJECT GOALS AND OBJECTIVES?**

The major costs of this project are the funds needed to hire a temporary botanist (IMLS-CP funds) to work directly with Garden staff (applicant match) to complete the inventory and databases for the Battle Park tract. Because we have been involved in similar surveys in the past, we have confidence that we can complete the work within the 18-month period as specified. All non-personnel costs (computer time, supplies, GPS units, digital cameras, transportation, and overhead) are contributed by us.

## **8. WHAT ARE THE QUALIFICATIONS AND RESPONSIBILITIES OF THE PROJECT PERSONNEL?**

The resumes of the following key Garden staff members are attached: Peter White (Director), Johnny Randall (Assistant Director for Conservation Programs), Alan Weakley (Curator of the University of North Carolina Herbarium), Carol Ann McCormick (Assistant Curator of the University of North Carolina Herbarium), and Stephen Keith (Curator of Battle Park). We also attach a job description for our temporary botanist.

Peter White (PhD, plant ecology, Dartmouth College) became director in 1986. He is also Professor of Biology at the University. Formerly a postdoc at the Missouri Botanical Garden and Research Biologist in Great Smoky Mountains National Park, he has carried out numerous plant and vegetation surveys, including work associated with invasive exotic plants and wind disturbance. He serves on the board of the North Carolina Plant Conservation Program and the Center for Plant Conservation. He has published over 100 scholarly papers. He received the Award of Excellence from the National Garden Clubs, Inc., in 2004.

Alan Weakley (PhD candidate, Duke University) became Curator of the University of North Carolina Herbarium in 2001. He is recognized as a leading expert on the taxonomy of plants in the Southeast and is currently completing a manual of the plants of Virginia, the Carolinas, and Georgia.

Carol Ann McCormick (BA, St Olaf's college) has been Assistant Curator of the Herbarium since 1999. She has extensive background in field natural history survey, including work at Bowman's Hill Wildflower Preserve and the North Carolina Botanical Garden. She is in charge of Herbarium assistants and volunteers and oversees the specimen databasing at the Herbarium. She coauthored a book on wildflowers with Garden Director Peter White.

Stephen Keith (BA, University of North Carolina) has just been hired as the Curator of Battle Park, but he is not new to the Garden staff, having joined us in 1996. He has extensive experience in our other natural areas, including our Nature Trails, Mason Farm Biological Reserve, and Coker Pinetum. He has worked on our invasive exotic plant removals, both as part of a team and in directly supervising volunteers. He wrote the Garden's emergency plan and has been in charge of our successful program to remove hazard trees and limbs from visitor use areas.

The temporary botanist (job description attached) will have a minimum of a MS in botany or plant ecology or show equivalent work experience. The temporary botanist will be experienced in field survey, identification of all higher plants, and familiar with the flora of North Carolina.



### Schedule of Completion

[illegible]

# Project Budget Form

## SECTION 2: CONSERVATION DETAILED BUDGET

Year ☒ 1 ☐ 2 ☐ 3 - Budget Period from 05 / 01 / 05 to 04 / 30 / 06

Name of Applicant Organization North Carolina Botanical Garden

IMPORTANT! READ INSTRUCTIONS ON PAGES 3.3-3.5 BEFORE PROCEEDING.

### SALARIES AND WAGES (PERMANENT STAFF)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Director	(1)	0.025 x Ann Salary	0	2,487	2,487
Curator	(1)	0.80 x Ann Salary	0	28,800	28,800
Curator	(1)	.05 x Ann Salary	0	3,633	3,633
Assist. C	(1)	.05 x Ann Salary	0	1,339	1,339
TOTAL SALARIES AND WAGES			\$ 0	36,259	36,259

### SALARIES AND WAGES (TEMPORARY STAFF HIRED FOR PROJECT)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Botanist	(1)	1 year x \$35,000	35,000	0	35,000
	( )				
	( )				
	( )				
TOTAL SALARIES AND WAGES			\$ 35,000	0	35,000

### FRINGE BENEFITS

RATE		SALARY BASE	IMLS	APPLICANT	TOTAL
13.5	% of \$	65,139		8,794	8,794
18.1	% of \$	1,913	0	692	692
Medical (Botanist)	% of \$	Flat rate	3,431	0	3,431
TOTAL FRINGE BENEFITS			\$ 3,431	9,486	12,917

### CONSULTANT FEES

NAME/TYPE OF CONSULTANT	RATE OF COMPENSATION (DAILY OR HOURLY)	NO. OF DAYS (OR HOURS) ON PROJECT	IMLS	APPLICANT	TOTAL
TOTAL CONSULTANT FEES			\$		

### TRAVEL

FROM/TO	NUMBER OF: PERSONS DAYS	SUBSISTENCE COSTS	TRANSPORTATION COSTS	IMLS	APPLICANT	TOTAL
	( ) ( )					
	( ) ( )					
	( ) ( )					
	( ) ( )					
TOTAL TRAVEL COSTS				\$		

# Project Budget Form

## SECTION 2: CONSERVATION DETAILED BUDGET CONTINUED

 Year ☒ 1 ☐ 2 ☐ 3

### MATERIALS, SUPPLIES AND EQUIPMENT

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Data sheets, labels	1000 x \$0.10	0	100	100
Herbarium sheets	100 x \$0.20	0	200	200
GPS Unit	1 unit	0	2,400	2,400
<b>TOTAL COST OF MATERIALS, SUPPLIES, &amp; EQUIPMENT</b>		\$ 0	2,700 ✓	2,700 ✓

### SERVICES

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Photocopying	1000 sheets x 0.10	0	100	100
Printing of historic photos	50 x \$10	0	500	500
<b>TOTAL SERVICES COSTS</b>		\$ 0	600 ✓	600 ✓

### OTHER

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
<b>TOTAL OTHER COSTS</b>		\$ 0	3,300	2,300

<b>TOTAL DIRECT PROJECT COSTS</b>	\$ 38,431	44,240 ✓	87,396 ✓
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### INDIRECT COSTS

Check either item A or B and complete C. (See section on Indirect Costs, pages 3.4–3.5.)

Applicant organization is using:

- ☒ A. An indirect cost rate which does not exceed 15 percent of modified total direct costs charged to IMLS.  
☐ B. Federally negotiated indirect cost rate (see pages 3.4–3.5).

Name of Federal Agency

Expiration Date of Agreement

Rate base amount

\_\_\_\_\_ 10 % of \$ 44,240 = \$ 4,420

	IMLS	APPLICANT	TOTAL
<b>C. TOTAL INDIRECT COSTS</b>	\$ 0	4,420	8,740 ✓

# Project Budget Form

## SECTION 2: CONSERVATION DETAILED BUDGET

Year ☐ 1 ☒ 2 ☐ 3 - Budget Period from 05 / 01 / 06 to 11 / 30 / 06

Name of Applicant Organization North Carolina Botanical Garden

IMPORTANT! READ INSTRUCTIONS ON PAGES 3.3-3.5 BEFORE PROCEEDING.

### SALARIES AND WAGES (PERMANENT STAFF)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Director	(1)	0.025 x .5 x Ann Salary	0	1,244	1,244
Curator	(1)	0.80 x .5 x Ann Salary	0	14,400	14,400
Curator	(1)	.05 x .5 x Ann Salary	0	1,866	1,866
Assist. C	(1)	.05 x .5 x Ann Salary	0	670	670
TOTAL SALARIES AND WAGES			\$ 0	18,180	18,180

### SALARIES AND WAGES (TEMPORARY STAFF HIRED FOR PROJECT)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Botanist	(1)	.5 year x \$35,000	17,500	0	17,500
	( )				
	( )				
	( )				
TOTAL SALARIES AND WAGES			\$ 17,500	0	17,500

### FRINGE BENEFITS

RATE		SALARY BASE	IMLS	APPLICANT	TOTAL
13.5	% of \$	32,570		4,398	4,398
18.1	% of \$	1,913	0	346	346
Medical (Botanist)	% of \$	Flat rate	1,715	0	1,715
TOTAL FRINGE BENEFITS			\$ 1,715	4,744	6,459

### CONSULTANT FEES

NAME/TYPE OF CONSULTANT	RATE OF COMPENSATION (DAILY OR HOURLY)	NO. OF DAYS (OR HOURS) ON PROJECT	IMLS	APPLICANT	TOTAL
TOTAL CONSULTANT FEES			\$		

### TRAVEL

FROM/TO	NUMBER OF: PERSONS DAYS	SUBSISTENCE COSTS	TRANSPORTATION COSTS	IMLS	APPLICANT	TOTAL
	( ) ( )					
	( ) ( )					
	( ) ( )					
	( ) ( )					
TOTAL TRAVEL COSTS				\$		

# Project Budget Form

## SECTION 2: CONSERVATION DETAILED BUDGET CONTINUED

 Year ☐ 1 ☒ 2 ☐ 3

### MATERIALS, SUPPLIES AND EQUIPMENT

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Data sheets, labels	500 x \$0.10	0	50	50 ✓
Herbarium sheets	500 x \$0.20	0	100	100 ✓
		0		
<b>TOTAL COST OF MATERIALS, SUPPLIES, &amp; EQUIPMENT</b>		\$ 0	150	150 ✓

### SERVICES

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Photocopying	1000 sheets x 0.10	0	100	100 ✓
<b>TOTAL SERVICES COSTS</b>		\$ 0	100	100 ✓

### OTHER

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
<b>TOTAL OTHER COSTS</b>		\$ 0	250	250

<b>TOTAL DIRECT PROJECT COSTS</b>	\$ 19,215	20,811 ✓	44,105
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### INDIRECT COSTS

Check either item A or B and complete C. (See section on Indirect Costs, pages 3.4–3.5.)

Applicant organization is using:

- ☒ A. An indirect cost rate which does not exceed 15 percent of modified total direct costs charged to IMLS.  
☐ B. Federally negotiated indirect cost rate (see pages 3.4–3.5).

Name of Federal Agency

Expiration Date of Agreement

Rate base amount

10 % of \$ 20,811 = \$ 2,081

	IMLS	APPLICANT	TOTAL
<b>C. TOTAL INDIRECT COSTS</b>	\$ 0	2,081	2,081

# Project Budget Form

## SECTION 1: SUMMARY BUDGET, CPS AND EDUCATION COMPONENTS

Name of Applicant Organization North Carolina Botanical Garden

IMPORTANT! READ INSTRUCTIONS ON PAGES 3.3-3.5 BEFORE PROCEEDING.

## DIRECT COSTS

	IMLS	Applicant	Total
SALARIES & WAGES	<u>52,500</u> ✓	<u>54,439</u> ✓	<u>106,939</u>
FRINGE BENEFITS	<u>5,146</u>	<u>14,230</u>	<u>19,376</u>
CONSULTANT FEES	<u>          </u>	<u>          </u>	<u>          </u>
TRAVEL	<u>          </u>	<u>          </u>	<u>          </u>
MATERIALS, SUPPLIES & EQUIPMENT	<u>          </u>	<u>2,850</u>	<u>2,850</u>
SERVICES	<u>          </u>	<u>700</u>	<u>700</u>
OTHER	<u>          </u>	<u>          </u>	<u>          </u>
<b>TOTAL DIRECT COSTS</b>	<b>\$ <u>57,646</u></b>	<b>\$ <u>65,051</u>✓</b>	<b>\$ <u>131,501</u>✓</b>
<b>INDIRECT COSTS</b>	<b>\$ <u>          </u></b>	<b>\$ <u>13,150</u></b>	<b>\$ <u>13,150</u></b>
<b>TOTAL PROJECT COSTS</b>			<b>\$ <u>144,651</u></b>

AMOUNT OF CASH-MATCH \$ 3,550

**AMOUNT OF IN-KIND CONTRIBUTIONS** \$ 74,676

TOTAL AMOUNT OF MATCH (CASH & IN-KIND CONTRIBUTIONS) \$ 78,201

AMOUNT REQUESTED FROM IMLS, INCLUDING INDIRECT COSTS \$ 57,646

PERCENTAGE OF TOTAL PROJECT COSTS REQUESTED FROM IMLS 46 %  
(MAY NOT EXCEED 50%)

Have you received or requested funds for any of these project activities from another federal agency?  
(Please check one) ☐ Yes ☒ No

If yes, name of agency \_\_\_\_\_

Request/Award amount \_\_\_\_\_

**University of California, Arboretum Santa Cruz**  
**(Sample Education Component)**  
Santa Cruz, California

Project Type: General Survey

IMLS Award: \$46,940 (includes \$9,800 for education component)

Match: \$67,297

Total Project: \$114,237

Museum Budget: \$785,000

\$46,940 to conduct an general conservation survey of the Arboretum's living plant collections (including seeds), non-living collections, its grounds and facilities including the general survey, the staff, student, and volunteer training workshop, and production of the Long-Range Conservation Plan. \$9,800 to produce educational interpretive; one highlighting the rare and endangered plants and animals protected under the stewardship of the Arboretum and one describing its relationship to the history of human activity on the site. Also, revamping the existing website within the context of conservation.



# The Arboretum of the University of California Santa Cruz: Narrative Questions

## Conservation Project Support

### 1. What is the Design of the Project?

The Arboretum of the University of California, Santa Cruz (Arboretum) requests \$29,402 from the Institute of Museum and Library Services to conduct a General Conservation Survey of its living plant (including stored seed) and non-living (library holdings and photographic images) collections and facilities during 2005.

In 2005, the Arboretum celebrates its 40<sup>th</sup> year of studying, protecting, and promoting the world's botanical diversity. In October 2001, under a new Executive Director and guided by a new Mission Statement committed to conservation within all of its programmatic activities, the Arboretum began to evaluate each collection and program in anticipation of developing a comprehensive Master Plan. The Arboretum Master Plan is part of the UCSC Campus Long Range Development Plan slated for completion in 2005-6. For identifying and defining the long range development goals of the Arboretum and in planning for the future, this is the best time for the Arboretum to conduct a general conservation survey establishing standards and priorities for collections conservation care and ensuring sustainable preservation of its valuable living and non-living collections. The overall objective of the general conservation survey is to generate detailed information concerning the conditions of the collections, to identify strengths and weaknesses within the collections with reference to conservation and proper care, to create standards for care, and establish clear present and future conservation priorities for the collections. Without a general conservation survey and associated staff training opportunities, the efforts of the curatorial and horticultural staff may be compromised and possibly inefficiently managed. The Arboretum will use the resulting general conservation survey report as a blueprint for the Long-Range Conservation Plan within the Arboretum Master Plan. The Conservation Plan will guide our future facilities development as we expand the collection, improve educational programming to inform about measures the Arboretum is taking to conserve and perpetuate the collections, expand research opportunities to best conserve the valuable resources the Arboretum is responsible for, and enhance our public service to best provide for informal education opportunities, and fund-raising initiatives to assist with the building and conservation of the collections. The general conservation survey will support and help define policies and standards for future acquisition and accessioning, collections development and maintenance, emergency procedures and preparedness, and sustainable conservation activities to safeguard all of our valuable collections.

The Arboretum will undertake four primary activities in 2005 to complete the general conservation survey. A collections team from the Arboretum consisting of Daniel Harder, the Executive Director, Brett Hall, the Director of Horticulture and Living Collections, Stephen McCabe, the Research and Education Coordinator, and Helen Englesburg, the Nursery Manager will partner with four project consultants to complete the survey. The consultants include Bart O'Brien, Director of Horticulture and Curator of Living Collections, Rancho Santa Ana Botanic Garden, Warren Roberts, Superintendent of Collections, the Arboretum at UC Davis, Deborah Roussopoulos, Archivist and Library Conservator, and Mark Oatney, image archivist and professional photographer. The collections team of Arboretum staff, together with the consultants, comprise the Survey Team and each have been carefully chosen to address the diversity of the Arboretum's collections and include specialists with expertise in plants of Mediterranean climates, California flora, library collections, photographic archives, and seed storage. Other Arboretum curatorial and horticultural staff personnel will work closely with the survey team as necessary.

**Activity 1: General Conservation Survey.** In July of 2005, over a two-week period, the living collections survey team, coordinated by Mr. Hall and led by Mr. O'Brien (lead Consultant), will conduct a survey of the Arboretum's collections. The Survey Team of Mr. Hall, Mr. McCabe, Ms. Englesburg, and Dr. Harder from the Arboretum and Mr. O'Brien and Mr. Roberts as expert consultants, will investigate and evaluate the existing conservation strategies for the living plant collections in the display gardens, in containers, in the domes, in the polyhouses, and in the propagation houses. Salary support from IMLS is requested for Brett Hall, Stephen McCabe, and Helen Englesburg to facilitate proper and efficient execution of the survey during the two-week period. Mr. O'Brien and Mr. Roberts will also provide careful analysis and specialty perspective of the general conservation and operational status of the Arboretum and the seed repository. Working with library volunteers and Mr. McCabe, Ms. Roussopoulos will evaluate the conservation status of the library collections of books and reference materials. Mr. Oatney, working with Mr. Hall, Mr. McCabe and Dr. Harder, will evaluate the photographic archive as to its present condition, best preservation and organization methods, and conservation status. Each survey team will use a standard survey format (sample provided) for each collection (the living plants and seeds, the library holdings, and the image archive). These General Conservation Survey activities will generate results from an independent team of expert consultants and the findings and evaluations will form

the basis of the training component of Activity 2, the Training Workshop, and the Long-Range Conservation Plan of Activity 3.

**Activity 2: Training Workshop (July 2005).** After the nine-day General Conservation Survey, the consultants will hold a one-day workshop for curatorial and horticultural staff, students, and volunteers at the Arboretum. The workshop will present the results of the survey and present expert evaluation of the conservation practices presently used at the Arboretum. The workshop will provide a forum for the staff and volunteers to ask questions of the consultants and an opportunity to discuss and present accepted conservation standards for our living plant, seed collections, library holdings and image archive. The workshop will encourage open and direct discussion between the consultants and collections care staff, volunteers, and students. Activities 1 and 2 are scheduled for completion within a two-week period allowing an immediate focus on issues surrounding the existing conservation standards at the Arboretum and close interaction with the consultants in a timely manner. These two activities are scheduled for July at a time of year that is least disruptive of staff responsibilities and cognizant of the schedules of the consultants. (See 2b below).

**Activity 3: The Long-Range Conservation Plan (Sept – Jan 2006).** Dr. Harder, working with the four consultants, will summarize and highlight the survey's findings within the General Conservation Survey report. Once completed, this document will be integral to the Arboretum's Long-Range Conservation Plan. Working with Dr. Harder and Mr. Hall and based on the recommendations of the consultants and the workshop, the curatorial and horticultural staff will identify the strengths and weaknesses within the Arboretum in adequately caring for and conserving the living and non-living collections, establish conservation priorities, and create a comprehensive plan that prioritizes the generated list of sound conservation projects. The Long-Range Conservation Plan will designate priorities for the next ten years for existing and proposed collections. The prioritized listing of conservation projects will identify those items that can be completed within the normal operating budget for the Arboretum, those items requiring additional funding, and overarching issues of conservation affecting the Arboretum. Potential sources for funding will be included for each identified project. Once completed, the plan will be presented to the Arboretum Associates, Board of Directors for comment, adoption, and integration into the Arboretum's priorities for collections policies, development, and fundraising. The plan will become a valuable working document and will be revisited annually to reassess the accomplishments and priorities. Salary support for Dr. Harder during this 5 month period will be part of the match.

**Activity 4:** To encourage information sharing and networking with other institutions about collection conservation, Dr. Harder and Mr. Hall will travel to four California botanical gardens to discuss and investigate collection conservation activities to seek answers and observe resolutions to our conservation challenges. Travel support is requested from IMLS to fund these site visits and meetings. Rancho Santa Ana Botanical Garden, the University of California, Davis, Arboretum, Tilden Regional Parks, The University of California, Berkeley Botanical Garden, and the Santa Barbara Botanic Garden will be visited in August and September of 2005.

## **2a. What are the proposed conservation methods and why are they conservationally sound?**

Since this proposal is a request for funding of a general conservation survey, this project is not proposing specific conservation methodology, rather an analysis of current conservation status, needs, and programs in relation to accepted standards. The resulting General Conservation Survey, the basis for the Long-Range Conservation Plan, will identify the sound and accepted methods necessary to preserve, protect, and conserve the collections maintained and cared for by the Arboretum. The workshop is designed to present the results in an open, interactive forum to those directly responsible for applying the standards to the collections.

The Arboretum will undertake the general conservation survey to analyze its current collections care and conservation methods, the general condition of its facilities and grounds, and as the foundation to develop a sound, long-range conservation plan for improving its methods and effectiveness. The Arboretum has chosen outstanding consultants with complimentary expertise to participate in the project to ensure that the survey will meet and present the highest conservation standards. Each consultant brings both specific expertise in an area of the Arboretum's collections as well as knowledge and experience in the latest conservation methods for living plant collections and non-living, supporting reference collections. The survey team will utilize a survey format that is widely used and accepted in the field (sample provided).

The Arboretum has allotted nine days for the survey to allow enough time for a thorough consideration of our collections and facilities, yet guarantee excellent results are produced in an efficient and manageable manner. On the first day the consultants will meet with the curatorial and horticultural staff and the Executive Director before conducting the general

review of conditions, staffing, scope, policies, and practices. For the next eight days, each consultant will work individually with the collection team members corresponding to their area of expertise and complete an in-depth review of each collection area. On the tenth day, the consultants will lead a day-long workshop for the Arboretum collections staff, volunteers, and students. Mr. O'Brien, as lead consultant, working with Dr. Harder and Mr. Hall, will prepare a formal report of the results of the survey during the week following the focused survey activity and workshop.

## **2b. Describe your rationale for the proposed training curriculum.**

In an effort to openly and directly share the information from the General Conservation Survey, on the first day following the nine-day survey, an all-day workshop will be held at the Arboretum led by the four consultants and attended by Arboretum staff, volunteers, and students involved in collections care. The intent of the workshop is to raise awareness among those involved directly in caring for and maintaining the collections about accepted standards of collection conservation and allow critical issues to be presented regarding all of the Arboretum's collections. In the morning, each of the consultants will present their findings from the survey on existing conservation care for each collection (living plants, seed collections, image archive, and library holdings) at the Arboretum. The Consultants will then discuss appropriate and accepted standards for maintaining each collection, present how these standards relate to collections conservation care at the Arboretum, and discuss what methods their respective institutions use to meet these standards in practice. In the afternoon, the workshop participants will then organize into smaller, special interest groups (curatorial and horticultural staff and students, library volunteers, and image archive volunteers) each led by a consultant to discuss the findings and suggested conservation strategies and produce a working conservation plan for each collection. These conservation plans will enumerate conservation needs, prioritizing and categorizing these within each collection. The working plans will be integral to developing Activity 4, the Long Range Conservation Plan, where they will be placed into overall context and priority within the operations and budgeting of the Arboretum. Most importantly these working plans will be instrumental in insuring the continued preservation of the existing and future collections at the Arboretum. The training will involve the Survey Team, 5 additional curatorial and horticultural staff members, 3 student workers, and approximately 10 volunteers. The staff, volunteers, and students are interested to learn how best to take care of the collections within our existing resources and budget yet also keen to implement key priority projects with additional funding.

## **3. What is the object(s), historic structure(s), or specimen(s) that is the focus of this project?**

**Living Plant Collections:** The Arboretum's living plant collection, representing more than 300 flowering plant families, includes more than 9,200 accessions; 6,500 in outdoor display gardens, 1,900 in containers, and 800 in the Domes and polyhouses. Approximately 85% of the accessions are unique taxa and more than 98% of the collection is identified fully to species, variety, and/or cultivar. This diverse plant collection, one of the 10 richest in the U.S., includes diverse representation of Southern Hemisphere, Mediterranean climatic zone species including the largest collection of Australian plants outside of this country and equally large collections of plants from South Africa, New Zealand, California, and "Laurasian forests" (Temperate North America, Mexico and Asia). The Arboretum's exceptional climate also supports significant outdoor collections of world conifers (58 of 68 genera), outdoor and under glass displays of succulents and cacti, and North American and South African bulbs (the Arboretum recently received the bulb collection of Girard and Farwig once recognized by bulb taxonomist, Peter Goldblatt as the world's most comprehensive). Ninety-five percent of the collections are of "research-quality" supported by field collection information. These associated locality data improve the collection's value as supporting resources for research, education, and outreach programs. Additional special collections also cultivated at the Arboretum include rare fruits, carnivorous plants, ferns, and primitive angiosperms (including taxa in the Winteraceae, Amborellaceae, Tetracentraceae, Trochodendraceae). Through our Koala Blooms plant introduction program, choice selections and cultivars of Australian plants are gathered and cultivated at the Arboretum where they are evaluated for garden performance prior to release to local horticultural growers. These nursery partners then scale up production prior to a coordinated release to the public through their retail outlets and the Arboretum's very popular, bi-annual plant sales. The Arboretum has released more than 500 new plant selections to the horticultural industry that are now enjoyed by local gardeners. The Arboretum has approximately 1,000 seed accessions representing a safe repository for future collections enhancement, rejuvenation and conservation. These seeds represent original collections or seed collected from plants cultivated at the Arboretum. The Arboretum maintains and safeguards a comprehensive collection of the succulent genus *Dudleya* and protects rare and endangered California taxa (more than 35 plants) for research and public education. Two resident populations of federally-listed endangered animals, the red-legged frog and the Ohlone Tiger beetle, also provide excellent opportunity for interpretation and education highlighting the stewardship of the Arboretum for these organisms (see Educational Component). The Arboretum is an active partner in preserving the world's conifers working closely with the International Union for the Conservation of Nature and collaborating with other botanical gardens and arboreta around the world in safeguarding, conserving, and promoting

these important resources. Continuing for more than 40 years, the Arboretum's living-plant collection and associated field collection data and notes contribute significantly as a resource used extensively by the UCSC campus in teaching ecology, systematics (taught by Arboretum staff at the Arboretum), biogeography, taxonomy, molecular biology, and evolutionary biology. The grounds and collections are also used extensively by the UCSC Scientific Illustration program, local K-12 science education, teacher training programs, for public events at the Arboretum and locally, in national and international research, common garden experiments, in evaluation and trials identifying new introductions to the horticultural industry, and in support of national and international conservation programs in Australia, California, Central and Southern Africa, Chile, New Zealand, and Viet Nam. All inventories of living plants and seeds are complete and up to date.

**Non-Living Collections: Books:** The Jean and Bill Lane Library contains a rich and diverse collection of books, periodicals, and reference materials. Approximately, 1400 titles plus periodicals are presently available for use by researchers, students, and the public. The collection reflects the diversity and biogeographical focus of the collections and includes taxonomic, horticultural, botanical, and historical reference materials. Gifts, donations, and purchases of books continue to improve the library as an important resource for the campus, community and staff. This collection is not duplicated within any other library holding and provides complimentary listings to the nearby campus, McHenry Library. The Arboretum library is wholly volunteer staffed and is open to the public as a non-lending library five days a week. Staff, UCSC and Cabrillo Community College students, and visitors extensively use the resources available in the library for research projects, bibliographic reference, source of information for public inquiries about the cultivation of plants, and as a problem solver.

**Photographic Images:** Approximately 3500, 35mm photographic images are archived at the Arboretum and document each stage in the 40-year history of the institution. The image archive is housed in the Lane Library and contains labeled systematic images, floristic and ecological depictions, documented historic expeditions, and endangered and threatened taxa. This important collection is not inventoried or cataloged and, therefore, not very easily accessible for use by the staff, volunteers, students, and the public in research, promotion, public seminars, and educational programs. These images are important for the UCSC campus as early records of the land use of the Arboretum site including records of the adjacent historic district, early plantings, personnel, and previous land use. The campus has requested if the Arboretum can provide access to these images for UCSC promotion and historic record. The Arboretum wishes to make better use of this collection for workshops, lectures, teaching, and for our website. These images, once digitized and made available through our website, will enhance the data and use of the on-line catalog of accessions. Digitization of this collection is important for providing a broader range of information and images of our collections and activities for education, research and public service.

#### **4. How does the project relate to your museum's on-going conservation activities?**

The Arboretum was established in 1964 as a research, academic, and public educational unit within the University of California at Santa Cruz. With the hiring of a new Executive Director in October 2001, a new mission statement was adopted committing the Arboretum to furthering the understanding, appreciation and conservation of the evolutionary diversity of plants and their environments for the benefit of Humankind, establishing conservation as its operational foundation. Now in its 40<sup>th</sup> year, the Arboretum is still a young garden and charting its future growth and development must include sound considerations of how best to preserve and conserve these valuable existing resources and providing sound and workable standards to be applied for future collections growth. With a view at becoming one of the great botanical institutions of the world, the Arboretum continues to collaborate with researchers and botanical institutions worldwide to foster appropriate protection and study of the world's floras, particularly within very threatened, Mediterranean and sub-tropical habitats.

All conservation care and maintenance of the living collections is coordinated between the Executive Director, the Director of Horticulture and Living Collections, the Curators, and Nursery Manager. The curatorial and horticultural staff partner with individuals, local nurseries, local, state and national conservation organizations, and international botanical institutions to contribute their expertise to efforts to preserve the world's flora. We have active collaborative conservation projects with IUCN on world conifers, we are the botanical partner to the Santa Lucia Gradient Study along the Big Sur coast, we work with local and state native plant societies on rare plant surveys and plant rescues, international research partners on the floras of Australia, New Zealand, Central Africa (Zambia, Botswana), Chile, Madagascar, South Africa, and Vietnam. Each of these endeavors provide opportunities for collecting seeds and propagules and increase our collections, most recently through field expeditions in Australia, Chile, the Santa Lucia range, and Viet Nam. Within current projections and outlined within our Master Plan, the Arboretum will accession between 1,500 and 3,000 unique

collections annually. As these collections grow so will the responsibility for taking adequate care of them. The expert curatorial and horticultural staff does an outstanding job in caring for and conserving the existing collections and in insuring that losses are minimized, proper care is provided, and new selections are identified. Yet as the Arboretum considers its Master Plan influenced by the Long Range Conservation Plan resulting from this project and integrated into the campus Long Range Development plans, increases in the diversity of plants within our gardens, improving educational opportunities and outreach, and continuing to support teaching at UCSC and within our community are desired. Now is the time for a careful review of existing conservation methods, introducing the best methodologies and how these can be assured and maintained within future growth.

Careful evaluation by the curatorial and horticultural staff of the general health and success of the collections and a very active propagation program insures continued preservation of the existing collections. Active seed collection and banking, clonal propagation, and exchange programs with other botanical gardens and researchers insure that the resources entrusted to the care of the Arboretum are safely protected and promoted.

The database of the Library is the responsibility of the library volunteers and verified by the Research and Education Coordinator and the living collections database is presently maintained and updated by the curatorial staff and supervised by the Director of Horticulture and Living Collections. The library frequently receives gifts and makes purchases of books and periodicals for building the collection. The plant collections database is updated bi-monthly or as needed.

Photographic records of plants, landscapes, collecting expeditions, and illustrative materials are being gathered as these activities take place and are added to the image collection. A transparency duplicator is needed to produce a digitized catalog of existing and new images for easy organization and use by Arboretum staff, volunteers and students for presentations, teaching, publications, outreach, interpretation, and linking an image to the online database accessible through the website.

The plant collection, the library, and the image collection are inextricably linked to the Arboretum's mandate of supporting research, education, and public outreach. As each of these collections expand in the future it is important the Arboretum utilize the most effective methods in curating and maintaining these to insure their long-term health and usefulness.

The Executive Director and Staff are active educators and through teaching of UCSC courses, public seminars, workshops and symposia, promote conservation of the world's flora. Arboretum staff teach undergraduate and graduate courses on floristics, biogeography, ecology, and systematics for UCSC and Cabrillo College students. Practical workshops teach mapping, the use of water conserving methods of gardening, pest control, horticultural methods, rare and threatened taxa, highlight collection expeditions, and a variety of conservation related topics and subjects.

## **5. What are the anticipated benefits of this project?**

Expert evaluation of the living and non-living collections supported by this grant will help insure that methods enacted at the Arboretum are in accordance with accepted standards in current use and allow the accommodation of necessary changes and considerations to be implemented within future management plans. The results of the general conservation survey will become the foundation that the Arboretum uses to create a Long Range Conservation Plan. The general conservation survey and the associated training components, will reassure that existing methodology is in line with current standards and sufficient to adequately protect existing and future living plant accessions, projected growth and protection of the library resources, and proper care and accessibility of our image archive. Initially the strengths and weaknesses in collections care, suitability of existing environmental facilities, and overall safety and health of the living collections will be identified. The general survey will define and prioritize critical areas, such as staff development and training, conservation problems, collections policy management, and facilities development that must be strengthened for the Arboretum to develop appropriately and implement the highest accepted horticultural, library, and archival standards.

The General Conservation Survey will articulate how the Arboretum can best care for its existing and future collections. Better care of the living plant collections will lead to improved conservation methodology and preservation of these important resources for expanded research activities, increased scholarly activity and publications, increased numbers of plants for our plant sales and exchange with other institutions, better use of limited land and water, education opportunities, and informal education. The Survey will also identify how best to care for and organize its library holdings and image collection. Conserving this unique collection of reference materials related specifically to the



Arboretum's plant collections, its biogeography, and Arboretum activities (expeditions, course materials) will allow these resources to be mobilized and available for teaching, research, and education purposes.

**6. How will the applicant ensure that ongoing museum functions are not inhibited by these project activities?**

The general conservation survey is understood by the Executive Director and all concerned staff as a logical and welcomed step in the proper management and care of existing and future collections, and thus, is an integral aspect of the jobs of all staff involved in collections issues. There will be a time commitment from the collections team (the Executive Director, the Director of Horticulture and Living Collections, the Research and Education Coordinator, and the Curatorial staff) yet the willingness to participate to gain knowledge about proper collections care and its evaluation far outweighs the minimal time commitment for each individual. The staff have always worked well together in supporting and covering for individual commitments and, therefore, should not be any inhibition of on-going Arboretum operations of any department or of the organization in fulfilling its obligations. This collaborative coverage will also minimize impact of the proposed conservation survey on visitors and volunteers. The Arboretum and the University of California, Santa Cruz are committed to allocating sufficient resources to the project and will contribute the necessary staff time to insure the project is well managed and executed. The Arboretum's cost share will total \$XX,XXX or roughly XX.X% of the total CPS cost.

The visits of Mr Hall and Dr Harder to other botanical institutions including Rancho Santa Ana Botanical Garden, the University of California, Davis, Arboretum, Tilden Regional Parks, and the Santa Barbara Botanic Garden during August and September will take place as short, overnight visits to reduce the impact of having these individuals away from the Arboretum at one time. The office and curatorial staff of the Arboretum are capable of covering the operations during these absences and during the nine days of the survey. On-going functions of the Arboretum will not be compromised by these short absences by the Executive Director and Director of Horticulture and Living Collections.

Through the resulting Long Range Conservation Plan, the Arboretum will identify activities that will become part of the organization's general operations. This important plan will also identify those priorities that will require additional funding (internal or extramural) and possible funding sources to comply with the resulting recommendations and standards. The Arboretum will seek funding through federal grants (IMLS and other appropriate agencies), local and state government, private foundations, corporations and individuals. The Arboretum has begun to identify sources of funding responsive to appropriate and sustainable conservation methods and priorities from the resulting Long Range Conservation Plan.

**7. How does the project budget support the project goals and objectives?**

The project budget reflects the estimated costs for conducting the general conservation survey, holding a day-long workshop on standard collections care and specific collections care issues of the Arboretum, and developing a long-range conservation plan. The Arboretum worked with each consultant to determine the appropriate fees for their on-site and off-site involvement and these are presented in the budget. Each consultant has verified their commitment to the project and confirmed their availability during the times proposed. Travel costs to the four botanical gardens by the Executive Director and the Director of Horticulture and Living Collections and consultant travel are based on current government mileage rates (\$.37.5/mile), and federally accepted per-diem rates. All salary and fringe benefit costs are based on actual salaries and fringes for all staff involved in the project. In anticipation of beginning to catalog and organize the image archive collection of the Arboretum, a transparency duplicator will be purchased. The Arboretum, as part of the UCSC, currently has a federally-negotiated in-direct cost rate agreement of 49% of direct cost. A full justification of the proposed budget is attached.

**8. What are the qualifications and responsibilities of the project personnel?**

**Dr. Daniel Harder**, Executive Director, joined the Arboretum in October 2001 after serving as Associate Curator within the Division of Research at the Missouri Botanical Garden. Through this curatorship, working with herbarium collections and associated data management, program development in Africa and Indochina, and more than 11 years of extensive field collection experience, Dr Harder provides strong leadership in conservation methodology and organization to the Arboretum. As Executive Director of the Arboretum, Dr Harder provides leadership, management, and direction to personnel, programs and facilities. During this project Dr Harder will work with the collections team to develop and finalize the General Conservation Survey report and the Long-Range Conservation Plan. He will be responsible for presenting the plan to the Arboretum Associates Board of Directors and assist to integrate the plan into the institution's long-range plans and goals.

**Brett Hall**, Director of Horticulture and Living Collections, has been instrumental in the development of the Arboretum for over three decades. He has contributed significantly to the collections development through active field collecting programs for the Arboretum in Australia, New Zealand, New Caledonia, Mexico, and especially California. For over 25 years he has been responsible for the overall care and development of the living collections, initially as the Arboretum Manager and currently as Director of Horticulture and Living Collections. He will work closely with the Consultants and Staff on the overall survey of the living collections and seed repository.

**Stephen McCabe**, Cacti and Succulents Curator, and the Research and Education Coordinator, oversees the volunteers working in the Lane library. He will work with Ms. Roussoupoulos on the general conservation survey of the library's holdings and will be responsible for implementing the recommendations for collection conservation for the library.

**Helen Englesberg** (Curator, Nursery Manager) oversees the propagation greenhouses and nursery areas. Helen works directly with each collections curator and is knowledgeable of the care and propagation of most of the living plant collection. She will be a survey team member working directly with and providing important information to the consultants on collections care, conservation strategies, accessioning policies, and management.

**Collections Curators** including **Ron Arruda** (Curator, South African Collection), **Rick Flores** (Curator, California Native plant Collection), **Melinda Johnson** (the Elvenia Slosson Australian Garden and Curator of the Australian Collection), and **Tom Saucedo** (the Harry O. Warren Curator of the New Zealand Collection), are charged with the management of their assigned geographic garden areas. Their responsibilities include all aspects of collection care and development, design of garden displays, educational interpretation, event coordination, and grounds maintenance. As the Survey Team evaluates each collection of the Arboretum, involvement and input from each curator will be essential for a full evaluation. The curators will be responsible for implementing the recommendations of the general conservation survey. All Curators are classified as Museum Scientists within the UCSC Research Professional series.

**Bart O'Brien**, Director of Horticulture and Curator of Living Collections, Rancho Santa Ana Botanic Garden, Claremont, California. He is responsible for the direction of the horticulture department, and supervision on-site. His research interests are in native California plants, their taxonomy, origin and history, creating and selecting plants from California for introduction to horticulture, and is an active collaborator in numerous taxonomic and biogeographic studies. He has extensive field knowledge and an active publication record. During the project he will take the lead in evaluating the living collections, the seed storage facilities, and the databases for the Arboretum. He will also be instrumental in presenting the results at the conservation workshop, drafting and reporting the results of the survey, and producing the report with Dr. Harder and Mr. Hall.

**Warren Roberts**, Superintendent of Collections at the University of California, Davis Arboretum. He is responsible for managing the UC, Davis Arboretum collections through development and adherence to established policies and oversees the botanical accuracy of taxonomic naming of the collection and accurate record keeping. He has extensive experience in evaluating collections relative to standards of other botanical institutions and brings broad perspective on related collection conservation issues. During this project he will work closely with Bart O'Brien and the collections survey team to make an accurate assessment of the health, viability and conservation procedures

**Mark Oatney**, Mark Oatney Photography, Professional photographer and biologist with extensive experience in photo archive management, botanical photography, natural history, and native plants. During the project he will assess the image archive of the Arboretum and will make recommendations using accepted management practices to improve accessibility, utility, and preservation of the rich image collection. In the workshop he will present a summary of his findings and present industry standards for archival storage and retrieval of image and associated data.

**Deborah Roussoupoulos**, Librarian and Archive Specialist with academic and professional experience in library and information sciences. During the project she will assess the paper-based materials within the Jean and Bill Lane Arboretum Library for comparison against accepted standards for cataloging, archiving, and reference and make recommendations for improving the Arboretum collections care for these holdings. In the workshop she will summarize her findings and present industry standards as they relate to the present and future reference book collection.



## The Arboretum of the University of California, Santa Cruz Narrative Questions Education Component

### 1. What is the design of the Education Component?

- *project activities in detail, goals, and objectives of component and how they will be met*

The education component for this project will involve producing three distinct interpretive products. Available to visitors to the Arboretum and duplicated on the Arboretum web site, each product will interpret and highlight the on-going conservation activities of the Arboretum identified and evaluated by the General Conservation Survey. The three products include:

- A. An interpretive panel with a “behind the scenes” look at conservation activities within our publicly inaccessible areas, greenhouses and propagation houses.
- B. An interpretive panel highlighting the rare and endangered taxa of plants within the collection, the site’s endangered animals, and causes and implications of human activity.
- C. Web-site development within the context of conservation activities at the Arboretum and the institutional commitment to the conservation-driven mission.

Written in reader-friendly format, the first interpretive panel will give visitors basic information pertaining to living plant conservation and the variety of methods used to insure collections are maintained and properly cared for to minimize losses. For security reasons many of the horticultural production areas of the Arboretum are behind fences and locked gates stirring visitor curiosity about what takes place in these areas. Using color illustrations and graphics the interpretive panel will take the visitor through the various steps and considerations involved in caring for a diverse botanical collection; from seed collection, documentation, and proper storage to clonal propagation and techniques for maintaining genetic integrity. This panel will be installed in an area for maximum visitor contact outside of our meeting facility where tours and visitors are oriented to the gardens.

The second interpretive panel will be installed within the existing Patrick Elvander Taxonomy Trail used to familiarize students and visitors to the system of naming of plants and highlights unique and distinctive characters within plant families. This new panel will introduce the concept of rare, endangered, and threatened as it pertains to plants and animals and highlight the stewardship and contribution the Arboretum is making towards conservation of these organisms. Again, color illustrations and innovative graphics will show the plants and animals under Arboretum care and discuss the threatened biological diversity within Santa Cruz County. The panel will discuss the rich history of land use within the region and the extent of human activity that have impacted these populations. The message is that human activity caused reduction of the numbers of some individuals of plants and animals to the brink of extinction and the activities of the Arboretum and other institutions are involved in conserving them for future generations.

The third product will simply reproduce the two panels as full-color handouts and distributed more widely outside the Arboretum to the community, students, educators, native plant groups, gardening clubs, and any interested parties.

With the adoption of a new mission statement defining conservation as the operational foundation for all activities, the Arboretum desires to redevelop its web site to reflect this firm commitment. Highlighting each of our programs and activities and interpreting these within a conservation context for web visitors, we hope to further promote the Arboretum as an active partner in conservation. The above panels will be part of the new website as well as photos of rare plant and animal taxa at the Arboretum. A main feature of the new website will be the conservation activities at the Arboretum focusing on curatorial expertise, collections diversity, maintenance, proper documentation, and links to campus faculty, researchers and students worldwide.

- *amount of time staff and consultants will spend on the project*

The education component is scheduled to begin following the completion of the general conservation survey. The project staff will include the Research and Education Coordinator, the Executive Director, Consulting Graphics Designer/biologist, Webmaster of Arboretum (Ron Arruda), three work-study students in science illustration, and three Arboretum volunteers.

- *why your schedule of completion is appropriate*

The two panels and redesign of the Arboretum website can be completed in 6 months. The Executive Director, the webmaster, and the Research and Education Coordinator will produce the interpretive text for the panels and brochures and rewrite the content for the website within the first three months of the project. Two months will be allocated for the Graphic Designer to produce, edit and revise the layout for the panels and three months will be necessary for the finalizing the layout for the website. Printing, mounting, and placement in the Arboretum of the panels will be contracted locally and will require one month to complete.

- *any intended products*

Two, in-garden interpretive panels and brochures to complement existing trail panels and displays will be produced. A revamped website with supporting graphics and illustrations highlighting the collections conservation activities and new mission statement for the web-audience.

- *how education component relates to your conservation project*

The panels, brochures and website will discuss the conservation activities at the Arboretum and reinforce our commitment to the highest standard of preservation and conservation. Issues of collections conservation will be addressed by the general conservation survey and highlighted within the educational panels.

## **2. What are the anticipated benefits of this Educational Project?**

- *relevance to museum audience and outcomes of this project for your museum's general audience*

The panels and website will inform on-site and web-visitors of the importance of the activities of the Arboretum to collections conservation and preservation including horticultural practices, collection and accession data, botanical nomenclature, and collaborative efforts with other institutions and individuals.

- *how the benefits will be used by your museum and disseminated to your audience*

The panels will be part of a series of existing and planned panels to interpret the Arboretum mission and activities within a greater scientific context. The panels will be available to visitors to the Arboretum as a means of informal education. The brochures will be available at the Arboretum, easily distributed to off-site locations, and of interest to educators, conservationists, gardeners, and the general public. The website will be available for on-line contact with cyber-visitors to enhance the experience for them and promote the mission of the Arboretum in collections conservation. Duplicates of the produced panels and excerpts from the website can be used in the brochures for promotion and fund-raising.

- *potential for continuing the project after the planning period or after the initial implementation stage*

The panels and brochures are parts of a continuing series of interpretive panels and displays planned for the Arboretum. The website will continue to develop as new initiatives are adopted and further panels are produced.

## **3. How does the project budget support the education component?**

The costs for writing, editing, design and layout are based on current salary or consultant fees. The printing, mounting and set-up costs are based on provided estimates and past experience. Arboretum staff salaries are requested for developing the educational component.

## **4. What are the qualifications and responsibilities of the project personnel?**

**Stephen McCabe**, As Research and Education Coordinator he has planned and developed interpretive materials for the Arboretum and directed educational programs and teacher training workshops. He has represented the Arboretum to the media for events, opportunities and lectures and conducts independent and collaborative research projects. He has

developed the hummingbird trail and the Patrick Elvander Taxonomy Trail within the educational interpretive programs at the Arboretum. For the Educational Component Stephen will oversee the development of the two interpretive panels and work closely with the Graphics Designer to provide text copy and editorial comments on their layout and presentation.

**Daniel Harder**, Executive Director, joined the Arboretum in October 2001 after serving as Associate Curator within the Division of Research at the Missouri Botanical Garden. Through this curatorship, working with herbarium collections and associated data management, and more than 11 years of extensive field collection experience, Dr Harder provides strong leadership in conservation methodology and organization to the Arboretum. As Executive Director of the Arboretum, Dr Harder provides leadership, management, and direction to personnel, programs and facilities. During this project Dr Harder will work with the Graphics Designer and the Research and Education Coordinator to produce text copy and review the development of the interpretive panels and website.

**Ron Arruda** Curator of South Africa Collection and Arboretum Webmaster. As webmaster, he set up the original website design for the Arboretum and maintains all updates to the site. For this project, Ron will work closely with the Graphics Designer to develop the new website taking into account the various aspects of the site and integrate the collections conservation activities and the new mission statement.

**Anya Illes** is a multi-skilled artist, web designer, and biologist with a background in field biology and research. She has experience in a diverse array of media and industries with special training and interests in interpretive design, natural history, information graphics, science illustration, and biology. She has extensive experience in providing high-quality contracting services to research, education and interpretive organizations. For this project she will take the lead in producing the web design and revamping of the website within the new conservation mission for the Arboretum and collections conservation. She will work closely with the staff listed above, the work-study students and volunteers, to produce an innovative and popular website promoting the conservation activities of the Arboretum. Her extensive skill set and connections within the field will be best put to use in working on this project.

**UCSC students:** Three UCSC students from within the scientific illustrations major will assist in producing the necessary layout and graphics design of the interpretive panels and the interfaces within the website.

**Volunteers:** The Arboretum has several talented and skilled volunteers that are willing to donate their time to developing the interpretive panels and the website. Three will be integrated into these project activities during the project.

# Project Budget Form

## SECTION 2: CONSERVATION DETAILED BUDGET

Year ☒ 1 ☐ 2 ☐ 3 - Budget Period from 01 / JULY/ 05 to 31 / JAN / 06

Name of Applicant Organization UC Regents, ARBORETUM @ UC SANTA CRUZ

IMPORTANT! READ INSTRUCTIONS ON PAGES 3.3-3.5 BEFORE PROCEEDING.

### SALARIES AND WAGES (PERMANENT STAFF)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Exec. Dir.	(1)	10%/7mth/\$98,256		5,732	5,732
Dir. Horticulture	(1)	46%/1mth/\$56,520		2,165	2,165
Res/Ed Coo	(1)	46%/1mths/\$42,924		1,644	1,644
Lib. Nur. Man	(1)	46%/1mth/\$38,880		1,489	1,489
TOTAL SALARIES AND WAGES			\$	11,030	11,030

### SALARIES AND WAGES (TEMPORARY STAFF HIRED FOR PROJECT)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Students	(3)	16hrs @ \$9.15/hr	439		439
Volunteers	(10)	16hrs@\$11.45/hr		1,832	1,832
	( )				
	( )				
TOTAL SALARIES AND WAGES			\$ 439	1,832	2,271

### FRINGE BENEFITS

RATE		SALARY BASE	IMLS	APPLICANT	TOTAL
29	% of \$	5,732		1,662	1,662
49.5	% of \$	1,644		814	814
42.34	% of \$	2,165		777	777
TOTAL FRINGE BENEFITS			\$ 11*	3,796*	3,807

### CONSULTANT FEES

NAME/TITLE OF CONSULTANT	RATE OF COMPENSATION (DAILY OR HOURLY)	No. OF DAYS (OR HOURS) ON PROJECT	IMLS	APPLICANT	TOTAL
Horticulturist	\$350/day	12	4,200		
Horticulturist	\$350/day	10	3,500		
Image specialis	\$350/day	10	3,500		
Lib./Ar	\$350/day	10	3,500		
TOTAL CONSULTANT FEES			\$	14,700	14,700

### TRAVEL

FROM/TO	NUMBER OF PERSONS	SUBSISTENCE COSTS	TRANSPORTATION COSTS	IMLS	APPLICANT	TOTAL
Claremont/S.C.	(1) (12)	\$147/day	800x.375	2,064		2,064
Davis/S.C.	(1) (10)	\$147/day	400x.375	1,620		1,620
Livermore/S.C.	(1) (10)	\$147/day	200x.375	1,545		1,545
Local S.C.	(1) (10)		200x.375	75		75
TOTAL TRAVEL COSTS				\$	5,304	9,549*

# Project Budget Form

## SECTION 2: CONSERVATION DETAILED BUDGET

Year ☒ 1 ☐ 2 ☐ 3 - Budget Period from 01 / July / 05 to 31 / Jan / 06

Name of Applicant Organization UC Regents, ARBORETUM @ UC Santa Cruz

IMPORTANT! READ INSTRUCTIONS ON PAGES 3.3-3.5 BEFORE PROCEEDING.

### SALARIES AND WAGES (PERMANENT STAFF)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
_____	( )	_____	_____	_____	_____
_____	( )	_____	_____	_____	_____
_____	( )	_____	_____	_____	_____
_____	( )	_____	_____	_____	_____
TOTAL SALARIES AND WAGES			\$	_____	_____

### SALARIES AND WAGES (TEMPORARY STAFF HIRED FOR PROJECT)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
_____	( )	_____	_____	_____	_____
_____	( )	_____	_____	_____	_____
_____	( )	_____	_____	_____	_____
_____	( )	_____	_____	_____	_____
TOTAL SALARIES AND WAGES			\$	_____	_____

### FRINGE BENEFITS *Cont'd Additional FRINGE BENEFITS*

RATE		SALARY BASE	IMLS	APPLICANT	TOTAL
_____	36.5 % of \$	1,489	_____	543	543
_____	2.5 % of \$	439	11	_____	11
_____	% of \$	_____	_____	_____	_____
TOTAL FRINGE BENEFITS			\$	11	554

### CONSULTANT FEES

NAME/TYPE OF CONSULTANT	RATE OF COMPENSATION (DAILY OR HOURLY)	No. OF DAYS (OR HOURS) ON PROJECT	IMLS	APPLICANT	TOTAL
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
TOTAL CONSULTANT FEES			\$	_____	_____

### TRAVEL

FROM/TO	NUMBER OF: PERSONS DAYS	SUBSISTENCE COSTS	TRANSPORTATION COSTS	IMLS	APPLICANT	TOTAL
_____	( ) ( )	_____	_____	_____	_____	_____
_____	( ) ( )	_____	_____	_____	_____	_____
_____	( ) ( )	_____	_____	_____	_____	_____
_____	( ) ( )	_____	_____	_____	_____	_____
TOTAL TRAVEL COSTS				\$	_____	_____

# Project Budget Form

## SECTION 2: CONSERVATION DETAILED BUDGET CONTINUED

 Year ☒ 1 ☐ 2 ☐ 3

### MATERIALS, SUPPLIES AND EQUIPMENT

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Survey materials	retail	750		750
Transparency duplicator	retail			
Workshop supplies	retail	500		500
<b>TOTAL COST OF MATERIALS, SUPPLIES, &amp; EQUIPMENT</b>		\$ 1,250		1,250

### SERVICES

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
<b>TOTAL SERVICES COSTS</b>		\$		

### OTHER

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
<b>TOTAL OTHER COSTS</b>		\$		

<b>TOTAL DIRECT PROJECT COSTS</b>	\$ 21,715	16,658	46,071
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### INDIRECT COSTS

Check either item A or B and complete C. (See section on Indirect Costs, pages 3.4–3.5.)

Applicant organization is using:

- ☐ A. An indirect cost rate which does not exceed 15 percent of modified total direct costs charged to IMLS.  
☒ B. Federally negotiated indirect cost rate (see pages 3.4–3.5).

Dept. Health and Human Services

Name of Federal Agency

"07/01/04 until amended"

Expiration Date of Agreement

Rate base amount

\_\_\_\_\_ 49 % of \$ 42,607 = \$ 20,877

	IMLS	APPLICANT	TOTAL
<b>C. TOTAL INDIRECT COSTS</b>	\$ 12,715	8,162	20,877

# Project Budget Form

## SECTION 2: EDUCATION DETAILED BUDGET

Year ☒ 1 ☐ 2 ☐ 3 - Budget Period from 1 / Aug / 05 to 31 / Jan / 05

Name of Applicant Organization Arboretum @ UC SANTA CRUZ

IMPORTANT! READ INSTRUCTIONS ON PAGES 3.3-3.5 BEFORE PROCEEDING.

### SALARIES AND WAGES (PERMANENT STAFF)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Exec. Dir.	(1)	5%/7mths/98,256	—	2,866	2,866
Res/Ed Coord	(1)	9%/7mths/42,924	—	2,254	2,254
S.A. Curator	(1)	69%/1mth/38,112	—	2,188	2,188
	( )				
TOTAL SALARIES AND WAGES			\$	7,308	7,308

### SALARIES AND WAGES (TEMPORARY STAFF HIRED FOR PROJECT)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Students	(3)	180hrs x \$9.15	—	4,941	4,941
Volunteers	(3)	180hrs x \$11.45	—	6,183	6,183
	( )				
	( )				
TOTAL SALARIES AND WAGES			\$	11,124	11,124

### FRINGE BENEFITS

RATE		SALARY BASE	IMLS	APPLICANT	TOTAL
29.07	% of \$	2,866	—	831	831
49.50	% of \$	2,254	—	1,116	1,116
32.21	% of \$	2,188	—	705	705
TOTAL FRINGE BENEFITS			\$	2,652	2,776*

Please see  
attached  
FRINGE BENEFIT  
ADDENDUM

### CONSULTANT FEES

NAME/TYPE OF CONSULTANT	RATE OF COMPENSATION (DAILY OR HOURLY)	No. OF DAYS (OR HOURS) ON PROJECT	IMLS	APPLICANT	TOTAL
A. Illes, Graphic Design	\$50/hr	240 hrs	5,000	7,000	12,000
TOTAL CONSULTANT FEES			\$	5,000	7,000

### TRAVEL

FROM/TO	NUMBER OF: PERSONS	DAYS	SUBSISTENCE COSTS	TRANSPORTATION COSTS	IMLS	APPLICANT	TOTAL
Local S.C.	( 1 )	( 12 )		800x.375		300	300
	( )	( )					
	( )	( )					
	( )	( )					
TOTAL TRAVEL COSTS				\$		300	300



# Project Budget Form

## SECTION 2: EDUCATION DETAILED BUDGET

Year ☒ 1 ☐ 2 ☐ 3 - Budget Period from 1 / AUG / 05 to 31 / Jan / 06

Name of Applicant Organization UC REGENTS, ARBORETUM @ UCSC

IMPORTANT! READ INSTRUCTIONS ON PAGES 3.3-3.5 BEFORE PROCEEDING.

### SALARIES AND WAGES (PERMANENT STAFF)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
	( )				
	( )				
	( )				
	( )				
TOTAL SALARIES AND WAGES			\$		

### SALARIES AND WAGES (TEMPORARY STAFF HIRED FOR PROJECT)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
	( )				
	( )				
	( )				
	( )				
TOTAL SALARIES AND WAGES			\$		

### FRINGE BENEFITS

(Cont'd) ADDITIONAL FRINGE BENEFITS

RATE		SALARY BASE	IMLS	APPLICANT	TOTAL
	% of \$				
Students, 2.5	% of \$	4,941		124	124
	% of \$				
TOTAL FRINGE BENEFITS			\$		

### CONSULTANT FEES

NAME/TYPE OF CONSULTANT	RATE OF COMPENSATION (DAILY OR HOURLY)	No. OF DAYS (OR HOURS) ON PROJECT	IMLS	APPLICANT	TOTAL
TOTAL CONSULTANT FEES			\$		

### TRAVEL

FROM/TO	NUMBER OF: PERSONS DAYS	SUBSISTENCE COSTS	TRANSPORTATION COSTS	IMLS	APPLICANT	TOTAL
	( ) ( )					
	( ) ( )					
	( ) ( )					
	( ) ( )					
TOTAL TRAVEL COSTS				\$		

# Project Budget Form

## SECTION 2: EDUCATION DETAILED BUDGET CONTINUED

 Year ☒ 1 ☐ 2 ☐ 3

### MATERIALS, SUPPLIES AND EQUIPMENT

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Interpretative signs	2 x retail, \$900 each	1,800		1,800
<b>TOTAL COST OF MATERIALS, SUPPLIES, &amp; EQUIPMENT</b>		\$ 1,800		1,800

### SERVICES

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Printing and Mounting	2 signs @ \$1,500 each	3,000		3,000
<b>TOTAL SERVICES COSTS</b>		\$ 3,000		3,000

### OTHER

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
<b>TOTAL OTHER COSTS</b>		\$		

<b>TOTAL DIRECT PROJECT COSTS</b>	\$ 9,800	28,508	38,308
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### INDIRECT COSTS

Check either item A or B and complete C. (See section on Indirect Costs, pages 3.4-3.5.)

Applicant organization is using:

- ☐ A. An indirect cost rate which does not exceed 15 percent of modified total direct costs charged to IMLS.  
☒ B. Federally negotiated indirect cost rate (see pages 3.4-3.5).

Dept. Health and Human Services

"07/01/04 until amended"

Name of Federal Agency

Expiration Date of Agreement

Rate base amount

49 % of \$ 38,308 = \$ 18,771

	IMLS	APPLICANT	TOTAL
<b>C. TOTAL INDIRECT COSTS</b>	\$ 4,802	13,969	18,771

# Project Budget Form

## SECTION 1: SUMMARY BUDGET, CPS AND EDUCATION COMPONENTS

Name of Applicant Organization ARBORETUM @ UC SANTA CRUZ

IMPORTANT! READ INSTRUCTIONS ON PAGES 3.3-3.5 BEFORE PROCEEDING.

### DIRECT COSTS

	IMLS	Applicant	Total
SALARIES & WAGES	<u>439</u>	<u>31,294</u>	<u>31,733</u>
FRINGE BENEFITS	<u>11</u>	<u>7,115</u>	<u>7,126</u>
CONSULTANT FEES	<u>19,700</u>	<u>7,000</u>	<u>26,700</u>
TRAVEL	<u>5,304</u>	<u>300</u>	<u>5,604</u>
MATERIALS, SUPPLIES & EQUIPMENT	<u>3,050</u>	<u>0</u>	<u>3,050</u>
SERVICES	<u>3,000</u>	<u>0</u>	<u>3,000</u>
OTHER	<u>0</u>	<u>0</u>	<u>0</u>
<b>TOTAL DIRECT COSTS</b>	<b>\$ <u>31,504</u></b>	<b>\$ <u>45,709</u></b>	<b>\$ <u>74,163</u></b>
<b>INDIRECT COSTS</b>	<b>\$ <u>15,436</u></b>	<b>\$ <u>397</u></b>	<b>\$ <u>36,339</u></b>
<b>TOTAL PROJECT COSTS</b>	<b>\$ <u>124,027</u></b>		

AMOUNT OF CASH-MATCH \$ 0

AMOUNT OF IN-KIND CONTRIBUTIONS \$ 0

TOTAL AMOUNT OF MATCH (CASH & IN-KIND CONTRIBUTIONS) \$ 68,106

AMOUNT REQUESTED FROM IMLS, INCLUDING INDIRECT COSTS \$ 46,940

PERCENTAGE OF TOTAL PROJECT COSTS REQUESTED FROM IMLS 45.7 %  
(MAY NOT EXCEED 50%)

Have you received or requested funds for any of these project activities from another federal agency?  
(Please check one) ☐ Yes ☒ No

If yes, name of agency \_\_\_\_\_

Request/Award amount \_\_\_\_\_

**Norwich Free Academy, Slater Memorial (Sample Education Component)**  
Norwich, Connecticut

Project Type: Detailed Survey

IMLS Award: \$36,427 (includes \$3,465 for education component)

Match: \$36,784

Total Project: \$73,211

Museum Budget: \$195,000

\$36,227 to contact a detailed condition survey of the Museum's 147 piece plaster cast collection. \$3,465 to develop text panels to explain goals and objectives of the project. Also, educational programs will be designed addressing specific topics related to the condition survey.

**1. What is the design of the project?** The Slater Memorial Museum (SMM) of the Norwich Free Academy (NFA) will engage ArtCare Resources to conduct a detailed condition survey of the museum's plaster cast and American paintings collections. The condition survey of the 147 full sized plaster casts and 180 19<sup>th</sup> and early 20<sup>th</sup> century portraits and landscape paintings will determine their conservation needs, methods of treatment, related costs, and prioritize a treatment plan to be used for future conservation and resource planning in addition to an in-house maintenance plan.

Activities of the project will include on-site examination of each individual plaster cast. The examinations will utilize visual inspection augmented by specially devised lighting techniques, IR photography, and low magnification to identify prior repairs, structural deficiencies, areas of damage, and previously applied coatings. Each cast will be documented with a written report and digital photography, with special attention to coatings, areas of repair, structural concerns, and areas of current damage or insecurity. Analysis of the coatings will be undertaken for visual anomalies and consistencies. Samples will be chosen from half of the collection as examples of different coatings for cross sectioning, FTIR analysis, and chromatography. Analysis will verify existing archival information concerning the original patination formula. Spot tests will be undertaken to develop an in-house maintenance plan, which will include a checklist of tasks (including procedures and frequencies), equipment and supplies for museum staff implementation. Cleaning tests will be done on two casts to determine if the original patina or subsequent layers can be safely exposed. Casts with identified structural concerns will be x-rayed on site with the support of the Connecticut Air National Guard and their portable x-ray equipment. This specialized investigation will reveal the internal structure of the areas at risk and aid in determining a prioritized treatment plan.

Activities of the project will also include examining each of the identified 19<sup>th</sup> and early 20<sup>th</sup> century paintings using photofloods; a handheld ultraviolet lamp; and a digital camera equipped with IR filters. Normal light examination will be conducted with up to 5x magnification. The obverse and reverse of each painting and frame will be examined. Construction techniques, general condition, detailed description of any damages, size, location, an estimated treatment plan and estimated treatment costs will be noted for each painting and frame on a survey form developed specifically for this project. The museum staff will use the form in the future to periodically monitor the paintings. The conservation survey will draw attention to paintings that may be particularly vulnerable to damage during an anticipated move to accommodate upcoming building renovations.

In preparation for moving the collections prior to upcoming renovations, it is critical to assess the condition of the Slater's most significant collections - the cast collection and the 19<sup>th</sup> and early 20<sup>th</sup> century paintings. The project will make it possible to stabilize the collection for transport, apply subsequent treatments while the museum is closed for renovation, develop a budget and seek funding for implementation.

The Slater Museum continues to be heated by the original steam radiators during the winter, and has no cooling system whatsoever. The result of drastic daily fluctuations in temperature and relative humidity throughout the years is evident in the fragile condition of these collections. The NFA's governing board is deeply committed to a multi-phase (up to \$15 million) restoration and renovation of the Slater Museum building and the adjacent 1906 Converse Art Gallery. A non-federal match of \$1 million has been committed by an appropriation through the State of Connecticut. In 2004, an initial \$579,320 was committed by NFA for architectural services, engineering, project oversight and fundraising. This project will include adding a comprehensive HVAC system, along with a new safety and security system, upgrades to electrical, plumbing, and lighting systems, adding new storage and collections preparation facilities and an elevator to make the two buildings universally accessible.

**Two conservators will conduct a detailed condition survey of 147 plaster casts.**

-*Visual inspection of each cast* - The conservators will use specially devised lighting techniques, infrared photography, and low magnification to identify prior repairs, structural deficiencies, areas of damage and previously applied coatings.

-*Written documentation of the examinations and digital photography*- Weekly notes and images taken on-site will be processed during an "office day"

-*Analysis of a sample of coatings* - Samples will be chosen from half of the collection as examples of different coatings for cross-sectioning, FTIR analysis and chromatography to be conducted by Orion Analytical, LLC.

-*Spot tests will be taken to develop in-house maintenance plan* - Based on information gathered, maintenance procedures and frequencies, necessary equipment and supplies will be identified for subsequent and ongoing staff implementation.

-*Casts with identified structural concerns will be x-rayed to aid in determining treatment priorities* - The Connecticut Air National Guard will provide trained staff and portable x-ray equipment and will work in conjunction with the project conservators to accomplish this component of the project.

**One conservator will conduct a detailed condition survey of 180 paintings.**

-*Each painting will be examined, obverse and reverse (including the frame)* - General construction techniques, general condition and more detailed descriptions of any damage or insecurities will be noted for each painting and frame on the survey form developed for this project.

-*Treatment priority, an estimated treatment plan and cost will be determined for each painting* - As each painting is examined, a treatment plan and estimated cost will be determined. Upon completion of the survey, treatment priorities will be established with the museum staff based upon curatorial considerations and stability concerns during renovation-related transport.

Alexandra Allardt, project conservator:

- 40 days on-site surveying cast collection; conducting three-one hour educational programs
- 20 days off-site preparing reports and education materials

Cary Beattie Maguire, project conservator:

- 40 days on-site assisting with survey of cast collection
- 20 days on-site surveying paintings collection; conducting three-one hour education programs
- 14 days off-site preparing reports and education materials

Vivian Zoë, museum director

- 12 hours per week from July 1 to December 30, 2005 and from March 1 to April 30, 2006

Susan Frankenbach, collections manager

- 22 hours per week from July 1 to December 30, 2005 and from March 1 to April 30, 2006

Art Handling Assistant (part-time, project-dedicated)

- 480 total hours scheduled as needed for duration of project (July 1, 2005 to April 30, 2006)

The schedule was arranged in consideration of the academic year as well as the seasonal temperatures that affect the interior climate of the museum and storage areas. Beginning the survey at the start of summer recess will allow the conservators access to the casts without interrupting academic activities. Equipment placement and project procedures will be well established by the beginning of school in the fall, allowing the conservators to conduct informal and structured sessions with students and the public about the project, methods etc. Conducting the painting survey in the early spring assures moderate temperatures in the

galleries and storage areas for project staff. Reasonable time was allowed for a thorough examination of both the cast and paintings collections and final report preparations.

The products of the project will be condition reports, treatment priorities, methods and costs of treatment for 147 19<sup>th</sup> century plaster casts, and 180 19<sup>th</sup> and early 20<sup>th</sup> century American paintings. A maintenance plan for the plaster cast collection, and monitoring procedures for the paintings will be provided for staff implementation.

To reduce potential damage due to handling and climatic changes, examinations of the casts and paintings will be conducted within the permanent galleries with adequate space cordoned off to allow for both the safety of the objects and conservators, as well as to provide museum visitors visual access to the project. For paintings in storage, an examination area will be arranged so that works can be easily accessed with minimal handling and can remain in a consistent climate.

**2a. What are the proposed conservation methods and why are they conservationally sound?** The proposed project is a planning and assessment process that will identify and document basic information needed for treatment procedures and priorities. This will help the Slater Museum plan for funding, staffing and consultants in a thoughtful and reasoned manner maximizing available resources. Individual examinations will utilize careful visual inspection, augmented by special lighting techniques, IR photography, and low magnification to identify prior repairs structural deficiencies, areas of damage, and (in the case of the casts) previously applied coatings. Scientific analysis of the cast coatings will provide valuable information that cannot be uncovered through a visual examination, but will provide essential compositional information to determine compatible cleaning (maintenance) solutions, as well as removal systems to reveal original coating and subsequent layers. X-rays are to be undertaken by the Connecticut Air National Guard represent in a local partnership that will reveal the internal structure, areas of weakness or corrosion, prior repairs, and inconsistencies in the casting process. Each painting and cast will be documented with a written report and digital photography, and supplemented with sketches.

**3. What are the objects that are the focus of this project?** The Slater Museum's inaugural collection of 147 plaster casts, taken from original marbles and bronzes of Ancient Egyptian, Greek, Roman, and Renaissance masterpieces, was installed in 1888. The casts were made in the cities where the originals were available; Athens, Rome, Florence, Berlin, Paris and London, and shipped in pieces to Norwich, where they were assembled by artisans familiar with specialized techniques. The hollow plaster casts were made in open molds by pouring or "splashing" the wet plaster in the inner mold surface; the thickness of plaster was gradually built up. After the first few layers started to dry, horsehair was dipped in new wet plaster and applied to help reinforce the cast. In this way a stronger, lightweight plaster could be made as opposed to a solid cast. Many flat wall casts and friezes made around the turn of the century were also reinforced with wood slats, which were secured on the inside of cast walls with horsehair plaster. The plaster surface was cleaned and hardened with a solution applied with an apparatus called the Von Deschend, invented in Berlin for this purpose. The Slater has the original documentation concerning this application.

The full-scale casts provide an exposure and experience well beyond that of an art history text or slide lecture. The casts, in some cases, present more accurate examples than the now often heavily deteriorated stone or bronze originals. Reflecting a worldwide 19<sup>th</sup> and early 20<sup>th</sup> century phenomenon that was occurring in other American museums such as the Metropolitan Museum, The Boston Museum of Fine Arts, and the Art Institute of Chicago, the Slater's cast collection is one of few remaining intact. In a rare twist of fate, circumstance, and influence, and unlike almost all of the other, similar collections that were discarded, the Slater's collection of plaster casts has remained largely unchanged for over a century.



The museum's collection of 180 19<sup>th</sup> and early 20th century paintings by American regional artists includes works by John Denison Crocker, Alexander Hamilton Emmons, Thomas Doughty, John Enneking, Alvan Fisher and Ozias Dodge. In addition to reflecting superior artistic skill and draftsmanship, these works portray genre scenes, landscapes and the built environment, capturing with unparalleled accuracy, life in Norwich and Southeastern Connecticut. Portraits by Erastus Salisbury Field, William Matthew Prior and Orlando Hand Bears contribute to the strength of the collection. These include portraits of members of families whose industry made the city into an economic powerhouse in the 19<sup>th</sup> century

Since the early 20<sup>th</sup> century, the museum collected additional casts and original artwork and artifacts that document the history, and reflects the character, of the city of Norwich and its contiguous farming communities as well as thousands of diverse objects of art and ethnography, including items from pre-contact native cultures, the Americas, Asia, Europe, Africa and Oceania comprise the collection. Today, the Slater Memorial Museum supports, enhances and enriches the Norwich Free Academy's programs by preserving, presenting, and interpreting art and artifacts, and by doing so, invites active and collaborative learning of the diversity of the human experience by all visitors through the medium of art. The Slater's collection is intended to augment the understanding of classical art, literature, and history for all visitors. It became, and remains, a repository and interpreter of a community's history and artistic oeuvre and the definitive cultural resource for the educational community of NFA, Norwich, and the general public. These two major collections - the plaster casts and the 19<sup>th</sup> -early 20<sup>th</sup> century paintings - are the foundations of the museum's collection, and are illustrative of the museum's mission to articulate the past and connect its relevance to the present.

#### **4. How does the project relate to your museum's ongoing conservation activities?**

The Slater Museum's custodial services are contracted with a reliable outside vendor through NFA. The museum's carpets are vacuumed regularly, floors are dry-mopped, and trash is removed daily. No plants, food or drink are allowed in the galleries. Objects on display are dusted under the supervision of the collections manager, who also is responsible for the upkeep of the two collection storage areas. NFA's facilities department maintains the building and its systems, and is on-call for repairs or problems.

Throughout its history, the museum's collections had been cared for by a handful of dedicated individuals whose tenures spanned decades. Though new technologies and procedures were being developed and available to safeguard objects from damaging environments and materials, the museum remained virtually unchanged for the past fifty years. Until recently, no professional conservation was ever applied to the collections. In 1999, NFA sought a Museum Assessment (MAP) under the auspices of the American Association of Museums (AAM). Included in its findings was the need for improved management practices and trained, professional, full-time staff. The NFA administration and governing board committed to pursuing all improvements necessary to achieve AAM accreditation. Since then, the newly hired professional museum staff has initiated individual conservation projects in response to critical condition problems on several objects in the collection, including paintings and decorative arts.

The proposed detailed condition survey is the next step in the Slater's conservation priorities. With the upcoming renovation to the building, which will include a comprehensive HVAC system, renovated galleries, collection care support areas and storage, the Slater is ready to specifically identify and prioritize the conservation needs of these two major collections. Subsequently, the museum will increase its annual budget for conservation and pursue grant funds to implement the survey's recommendations in preparation for transport prior to construction and for reinstallation in the renovated museum.

With 2004 funding from the Connecticut Humanities Council, the museum recently began a collections assessment to match a long range interpretation plan to the museum's holdings and to develop a plan to de-

accession those objects that do not fit its mission. Also awarded in 2004 is an IMLS Collections Management Assessment through MAP to be carried out in 2005.

In 2002, the Slater was awarded an NEH Preservation and Access grant to conduct a Conservation Assessment, which was completed in March 2003. While most of the goals of the survey will be met by the upcoming renovation, many of the intermediate recommendations have been implemented including:

- budgeting for collection care materials, projects and staff training
- implementing better housekeeping in galleries and storage
  - developing and implementing an integrated pest management plan
- refining security measures including a complete physical inventory of the collection
- expanding museum emergency preparedness to include partnership with school library for supplies and safe temporary storage locations
- documenting and monitoring existing temperature/relative humidity conditions
  - modifying local ambient conditions at the room level
- modifying light exposure factors with shutters and filters

As the Slater moves toward finalizing renovation plans, the safety of the collections is of primary importance. Not only must the physical needs of the collection be documented and accommodated, but the costs of preparing for this major project must be identified for resource allocation and fund-raising. The proposed detailed condition survey will provide specific cost information for these purposes.

For over a year, the museum has been engaged in planning with its architectural and engineering consultants to bring the museum structure and systems into code compliance and up to a standard appropriate for accredited museums. The NFA has committed significant funding in the past; repairing and replacing failed windows and roofs, and will seek and/or provide the estimated \$15 million required to fully restore and renovate the buildings *including elements needed for collections care*. The total cost amount anticipated for the planning phase alone is \$720,000, much of which will be provided by NFAs reserve for replacement funds.

**5. Anticipated benefits of this project?** Conducting the detailed conservation survey of the Slater's two most important collections will benefit the museum, its audiences and the museum field. After years of benign neglect, the NFA and its governing board are committed to bringing the museum's operations, facility and collections up to accreditation standards. Obtaining this critical condition and treatment information will allow the museum to move forward with further planning, budgeting and fundraising steps in the long-range conservation plan. Taking these timely and appropriate steps toward caring for the cast collection and the 19<sup>th</sup> and early 20<sup>th</sup> century painting collection not only demonstrates the museum's commitment to its mission and its position as the primary cultural resource in the area to our audiences, but will result in our audience's renewed respect and interest in the collections. During the second half of the 20<sup>th</sup> century, the collections of the Slater were an unknown to many U.S. museums and curators due to the lack of scholarly publications and loan exhibitions at the Slater. Accomplishing the steady and directed conservation of these primary collections will offer opportunities for research and publication of the 19<sup>th</sup> and early 20<sup>th</sup> century paintings, and will support the germination of renewed interest in the history and study of plaster casts proactively.

**6. How will the applicant ensure that ongoing museum functions are not inhibited by these project activities?** The proposed project's budget includes an additional staff member (temporary, part-time) to assist the conservators during each of the two collection surveys. The addition of this person will ensure that the museum director and the museum collections manager are available to attend to their regular duties. A small amount of their time has been appropriately dedicated to the project, and is reflected in the attached

budget. During the cast collection survey, small, moveable scaffolding will be set up in the main gallery for access to the casts. Half of the 19<sup>th</sup> and early 20<sup>th</sup> century paintings are on view in the museum, while the other half is in storage. During both cast and painting examinations in the galleries, the conservators will be visible behind stanchions to the museum visitors. This “conservation-in-action” will be a vehicle for the museum to introduce its audience to many aspects of caring for a collection: Please see additional information concerning these opportunities in the Education Component.

**7. How does the project budget support the project goals and objectives?** The project budget was developed collaboratively between ArtCare conservators and the museum staff. Ms. Allardt is very familiar with the museum and its collections, and has anticipated challenges that could impact the schedule. Adequate but reasonable time was budgeted to complete both cast and paintings surveys, considering the majority of examinations will occur within public gallery space. Including a part-time, dedicated art handler in the project will allow the museum to operate daily with less impact on its permanent staff and visitors.

**8. What are the qualifications and responsibilities of the project personnel?**

Alex Allardt, Objects Conservator will conduct examinations of the cast collection with the assistance of Cary Beattie Maguire. She will take samples for analysis, supervise and review x-rays, prepare treatment proposals and maintenance plan and conduct staff training of the cast maintenance plan. Ms. Allardt was trained at the SUNY Cooperstown Graduate Program. She established ArtCare Resources in 1978 and has completed conservation projects at the National Gallery of Art in Washington, D.C., Peabody Museum in Salem, MA and was the consultant for the Slater Museum’s NEH grant funded Preservation and Access project in 2002. Ms. Allardt has been involved with this project at an early point having visited the museum on numerous occasions. She has assisted in the development of the proposal, recommending a course of action, priorities and other conservators to carry out highly specialized work.

Cary Beattie Maguire, Paintings Conservator will assist Ms. Allardt in the cast collection survey. She will then conduct examinations of the 19<sup>th</sup> and early 20<sup>th</sup> century American paintings, and prepare prioritized treatment proposals. Ms. Maguire is a partner with Ms. Allardt at ArtCare Resources. She is a SUNY at Buffalo State College graduate in paintings and objects conservation and completed an internship at the Nelson Atkins Museum of Art in Kansas City, where she is currently on an extended contract. Ms. Maguire has worked on a variety of paintings and painted surfaces at the Shelburne Museum, the Philadelphia Museum of Art, Page Conservation Center and the Commonwealth Conservation Center in Harrisburg, PA.

Museum Director Vivian F. Zoë, who has twenty- five years of museum and historic site management experience, will oversee the proposed project. She has supervised restorations of National Historic Landmarks including the Noah Webster House in Connecticut and Craftsman Farms in New Jersey and the Charter Oak Temple in Hartford, CT. Since 1994, she has served as a peer reviewer for the American Association of Museums.

Susan Frankenbach, Collections Manager, will directly supervise outside consultants engaged for the project. Ms. Frankenbach served as Registrar of the Yale University Art Gallery from 1986 until 2001, during which time she oversaw many large-scale conservation and storage-related projects. She was responsible for planning the de-installation, storage and re-installation of collections for Yale’s current renovation project, as well as planning their new off-site collection storage facility.

Part-time Art Handler (to be hired). This person will be familiar with fundamental art handling procedures, supplies and equipment. S/he will have more than one year’s experience moving and installing both two-dimensional and three-dimensional objects in a fine arts museum or art gallery setting.

## 1. What is the design of the education component?

Educational components of the project include visual and oral presentations by the ArtCare Resources team for the public, students, teachers, and museum staff. The examination, preparation and the process for correcting earlier, non-professional repairs will be used as an opportunity to instruct the students of the Norwich Free Academy and the general public about conservation and the ways in which collections deteriorate. As the two conservators will be working on-site, a portion of each on-site day will provide informal exchanges with museum visitors. Text panels explaining the project, the analytical methods, and the findings will augment the informal exchanges. Two, one-hour programs will be developed by Alexandra Allardt, and three one-hour courses by Cary Beattie Maguire for student classes and public:

Cast Survey by Alexandra Allardt:

- **Materials and processes of cast construction**
- **Practical maintenance procedures to care for plaster casts and the effects of moisture, temperature fluctuations, untrained repairs**

Painting Survey by Cary Beattie Maguire:

- **Art handling** -The results of fingerprints, pens, food; samples of damaged art will be available for discussion
- **Examining paintings** - Students will examine a painting with the conservator; conservation tips on materials and practices for working artists.
- **Practical storage** - Preserving materials in daily life such as digital media, ink jet paper and inks, photo albums; archival materials will be discussed.

The goals and objectives of the educational component are to connect the professional procedures of the conservators to the Slater Museum's visitors' experiences with the collections. Text panels will describe the goal of determining the condition of each object and prioritizing its treatment. This signage will articulate to the casual visitor the responsibility held by museums to care for collections. The hour-long programs will focus on specific aspects of how objects deteriorate and what steps and conditions can be provided to ensure stability.

Each consultant conservator will spend three hours of preparation on each one-hour program, for a total of 15 hours. Museum staff members will contribute a total of 15 additional hours for text, signage and other material production.

The schedule of completing the preparations for the programs is appropriate since each conservator will accomplish it during dedicated "off-site" time. The programs will be presented while the condition surveys are ongoing in the museum, during the academic year.

The cast survey and the paintings survey will each have its own set of display signage articulating the project, procedures and goals, thus, the casual visitor will understand the cause and purpose of the disruption of museum exhibitions, which may include areas segregated by stanchions and arranged with high-intensity work lights. In addition, informational packets will be prepared for each educational program for students and the public to take away.

The educational component relates directly to the conservation project. Text panels will explain the project to the casual visitor, including the procedures, analytical methods, and findings of the surveys. Each hour-long program will offer opportunities for the project conservators to present the objectives, goals and steps to attain these to both students and the public.

## **2. What are the anticipated benefits of this educational project?**

The educational component will provide a direct connection between the museum's collections, and its visitors. This is an opportunity to articulate, with specific examples, the museum's primary responsibility to care and protect the collections for present and future publics. The educational component will strengthen the Slater's position as part of the fabric of the community, inviting further public involvement as treatment plans are implemented.

The outcomes of the educational component will include a more informed audience, with a greater appreciation for the wide variety of issues and responsibilities involved in caring for a museum collection, from basic housekeeping to sophisticated scientific analysis.

The potential for utilizing the educational information contained in the text panels beyond the residency of the conservators is significant. Language will be crafted to ensure a long lifespan of the text panels and the information will be folded into the museum's concurrent project of re-interpretation of the collections. The museum's staff, in collaboration with classroom teachers, will draw on educational program material for use in both introductory programs to the museum as well as in making direct connections between science, history and art.

## **3. How does the project budget support the education component goals and objectives?**

The project costs are based upon the consultant conservators' hourly rate and an estimation of time, as well as production costs, including supplies and printing.

The educational component is based on information that will evolve, as the result of the ongoing work during the conservation survey, and with a modest amount of additional time, will become permanent components of regular interpretation to visitors.

The project match includes museum staff time to implement the mechanics of the educational component; contracting vendors for text panel production and handout photocopying.

No indirect costs are identified with this component. Indirect costs are not included as a budget item and will be absorbed by the museum as a part of its general operating budget.

## **4. What are the qualifications and responsibilities of the project personnel?**

The consultant conservators, Alexandra Allardt and Cary Beattie Maguire, are the educational component personnel. Each XX will provide daily informal exchanges with museum visitors in response to their work; text panels will support live interpretation while the surveys are ongoing.

In addition, Ms. Allardt will spend 9 hours preparing two, one-hour educational programs about the plaster cast survey. She will present these programs in the museum lecture room to students and the general public. Ms. Allardt regularly lectures and conducts conservation workshops.

Ms. Maguire will spend 15 hours preparing three, one-hour educational programs focused on practical issues regarding the care for art objects. Ms. Maquire will present these programs in the museum lecture room to students and the general public.

# Project Budget Form

## SECTION 2: CONSERVATION DETAILED BUDGET

Year ☒ 1 ☐ 2 ☐ 3 - Budget Period from 07 / 01 / 05 to 04 / 31 / 06

Name of Applicant Organization The Norwich Free Academy Foundation, Inc. for the Slater Memorial Museum

IMPORTANT! READ INSTRUCTIONS ON PAGES 3.3-3.5 BEFORE PROCEEDING.

### SALARIES AND WAGES (PERMANENT STAFF)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
	( 1 )	12 hrs/wk x 34 weeks	0	12,835	12,835
	( 1 )	24 hrs/wk x 34 weeks	0	15,795	15,795
	( )				
	( )				
<b>TOTAL SALARIES AND WAGES</b>			\$ 0	28,630	28,630

### SALARIES AND WAGES (TEMPORARY STAFF HIRED FOR PROJECT)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Art Handler	( 1 )	\$25/hr x 480 hours	0	12,000	12,000
	( )				
	( )				
	( )				
<b>TOTAL SALARIES AND WAGES</b>			\$ 0	12,000	12,000

### FRINGE BENEFITS

RATE		SALARY BASE	IMLS	APPLICANT	TOTAL
26	% of \$	28,630	0	7,444	7,444
14	% of \$	12,000	0	1,680	1,680
	% of \$				
<b>TOTAL FRINGE BENEFITS</b>			\$ 0	9,124	9,124

### CONSULTANT FEES

NAME/TYPE OF CONSULTANT	RATE OF COMPENSATION (DAILY OR HOURLY)	NO. OF DAYS (OR HOURS) ON PROJECT	IMLS	APPLICANT	TOTAL
dt/Conserv.	\$85/hour	409 hours	31,656	3,109	34,765
a/Conserv.					
<b>TOTAL CONSULTANT FEES</b>			\$ 31,656	3,109	34,765

### TRAVEL

FROM/TO	NUMBER OF: PERSONS DAYS	SUBSISTENCE COSTS	TRANSPORTATION COSTS	IMLS	APPLICANT	TOTAL
Fr Newport RI	( 2 ) ( 40 )	9,600	840	0	10,440	10,440
Fr Newport RI	( 1 ) ( 20 )	2,400	210	0	2,610	2,610
	( ) ( )					
	( ) ( )					
<b>TOTAL TRAVEL COSTS</b>				\$ 0	13,050	13,050

# Project Budget Form

## SECTION 2: CONSERVATION DETAILED BUDGET CONTINUED

 Year ☒ 1 ☐ 2 ☐ 3

### MATERIALS, SUPPLIES AND EQUIPMENT

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Aluminum scaffolding	Price quote from local vendor	2,100	0	2,100
Quilts,ethefoam	Price in current supply catalog	340	0	340
Fan/ext.cords/surgeprot.	Price in current supply catalog	126	0	126
<b>TOTAL COST OF MATERIALS, SUPPLIES, &amp; EQUIPMENT</b>		<b>\$ 2,566</b>	<b>0</b>	<b>2,566</b>

### SERVICES

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Cross-section analysis	\$150 x 6 samples	0	900	900
FTIR analysis	\$250 x 6 samples	0	1,500	1,500
Chromatography	\$250 x 6 samples	0	1,500	1,500
<b>TOTAL SERVICES COSTS</b>		<b>\$ 0</b>	<b>3,900</b>	<b>3,900</b>

### OTHER

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Long-distance phone	Estimated	150	0	150
Long-distance faxes	Estimated	100	0	100
Office supplies	Estimated	50	0	50
<b>TOTAL OTHER COSTS</b>		<b>\$ 300</b>	<b>0</b>	<b>300</b>

<b>TOTAL DIRECT PROJECT COSTS</b>	<b>\$ 34,492</b>	<b>72,922</b>	<b>146,324</b>
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### INDIRECT COSTS

Check either item A or B and complete C. (See section on Indirect Costs, pages 3.4–3.5.)

Applicant organization is using:

- ☐ A. An indirect cost rate which does not exceed 15 percent of modified total direct costs charged to IMLS.  
☐ B. Federally negotiated indirect cost rate (see pages 3.4–3.5).

Name of Federal Agency

Expiration Date of Agreement

Rate base amount

\_\_\_\_\_ % of \$ \_\_\_\_\_ = \$ \_\_\_\_\_

	IMLS	APPLICANT	TOTAL
<b>C. TOTAL INDIRECT COSTS</b>	<b>\$ _____</b>	<b>_____</b>	<b>_____</b>



# Project Budget Form

## SECTION 2: EDUCATION DETAILED BUDGET

Year ☒ 1 ☐ 2 ☐ 3 - Budget Period from 07 / 01 / 05 to 04 / 31 / 06

Name of Applicant Organization Norwich Free Academy Foundation, Inc., for the Slater Memorial Museum

IMPORTANT! READ INSTRUCTIONS ON PAGES 3.3-3.5 BEFORE PROCEEDING.

### SALARIES AND WAGES (PERMANENT STAFF)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
	( 1 )	hourly wage x 5 hours	0	165	165
	( 1 )	hourly wage x 10 hours	0	205	205
	( )				
	( )				
<b>TOTAL SALARIES AND WAGES</b>			\$ 0	370	370

### SALARIES AND WAGES (TEMPORARY STAFF HIRED FOR PROJECT)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
	( )				
	( )				
	( )				
	( )				
<b>TOTAL SALARIES AND WAGES</b>			\$		

### FRINGE BENEFITS

RATE		SALARY BASE	IMLS	APPLICANT	TOTAL
26	% of \$	370	0	96	96
	% of \$				
	% of \$				
<b>TOTAL FRINGE BENEFITS</b>			\$ 0	96	96

### CONSULTANT FEES

NAME/TYPE OF CONSULTANT	RATE OF COMPENSATION (DAILY OR HOURLY)	No. OF DAYS (OR HOURS) ON PROJECT	IMLS	APPLICANT	TOTAL
conserv.	\$85/hour	11 hours	935	0	935
				0	
<b>TOTAL CONSULTANT FEES</b>			\$ 935	0	935

### TRAVEL

FROM/TO	NUMBER OF: PERSONS DAYS	SUBSISTENCE COSTS	TRANSPORTATION COSTS	IMLS	APPLICANT	TOTAL
	( ) ( )					
	( ) ( )					
	( ) ( )					
	( ) ( )					
<b>TOTAL TRAVEL COSTS</b>				\$		

# Project Budget Form

## SECTION 2: EDUCATION DETAILED BUDGET CONTINUED

 Year ☒ 1 ☐ 2 ☐ 3

### MATERIALS, SUPPLIES AND EQUIPMENT

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Program handouts	price per sheet @ \$.03	50	0	50
6 text panels	design/production \$125 each	750	0	750
<b>TOTAL COST OF MATERIALS, SUPPLIES, &amp; EQUIPMENT</b>		<b>\$ 800</b>	<b>0</b>	<b>800</b>

### SERVICES

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
<b>TOTAL SERVICES COSTS</b>		<b>\$</b>		

### OTHER

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Long-distance phone	Estimated	75	0	75
Long-distance faxes	Estimated	75	0	75
Office supplies	Estimated	50	0	50
<b>TOTAL OTHER COSTS</b>		<b>\$ 200</b>	<b>0</b>	<b>200</b>

<b>TOTAL DIRECT PROJECT COSTS</b>	<b>\$ 1,931</b>	<b>466</b>	<b>3,931</b>
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### INDIRECT COSTS

Check either item A or B and complete C. (See section on Indirect Costs, pages 3.4–3.5.)

Applicant organization is using:

- ☐ A. An indirect cost rate which does not exceed 15 percent of modified total direct costs charged to IMLS.  
☐ B. Federally negotiated indirect cost rate (see pages 3.4–3.5).

Name of Federal Agency

Expiration Date of Agreement

Rate base amount

\_\_\_\_\_ % of \$ \_\_\_\_\_ = \$ \_\_\_\_\_

	IMLS	APPLICANT	TOTAL
<b>C. TOTAL INDIRECT COSTS</b>	<b>\$</b>		

# Project Budget Form

## SECTION 1: SUMMARY BUDGET, CPS AND EDUCATION COMPONENTS

Name of Applicant Organization Norwich Free Academy Foundation, Inc. for the Slater Memorial Museum

IMPORTANT! READ INSTRUCTIONS ON PAGES 3.3-3.5 BEFORE PROCEEDING.

### DIRECT COSTS

	IMLS	Applicant	Total
SALARIES & WAGES	<u>                    </u>	<u>41,000</u>	<u>41,000</u>
FRINGE BENEFITS	<u>                    </u>	<u>9,220</u>	<u>9,220</u>
CONSULTANT FEES	<u>32,591</u>	<u>6,218</u>	<u>79,220</u>
TRAVEL	<u>                    </u>	<u>13,050</u>	<u>13,050</u>
MATERIALS, SUPPLIES & EQUIPMENT	<u>3,336</u>	<u>                    </u>	<u>3,336</u>
SERVICES	<u>                    </u>	<u>3,900</u>	<u>3,900</u>
OTHER	<u>500</u>	<u>                    </u>	<u>500</u>
<b>TOTAL DIRECT COSTS</b>	<b>\$ <u>36,427</u></b>	<b>\$ <u>73,388</u></b>	<b>\$ <u>150,256</u></b>
<b>INDIRECT COSTS</b>	<b>\$ <u>                    </u></b>	<b>\$ <u>                    </u></b>	<b>\$ <u>                    </u></b>
	<b>TOTAL PROJECT COSTS \$ <u>150,256</u></b>		

AMOUNT OF CASH-MATCH \$ 73,388

AMOUNT OF IN-KIND CONTRIBUTIONS \$ 3,500

TOTAL AMOUNT OF MATCH (CASH & IN-KIND CONTRIBUTIONS) \$ 36,427

AMOUNT REQUESTED FROM IMLS, INCLUDING INDIRECT COSTS \$ 76,868

PERCENTAGE OF TOTAL PROJECT COSTS REQUESTED FROM IMLS 50 %  
(MAY NOT EXCEED 50%)

Have you received or requested funds for any of these project activities from another federal agency?  
(Please check one) ☒ Yes ☐ No

If yes, name of agency National Endowment for the Arts

Request/Award amount Requested \$57,760

**Good Will Home Association, L.C. Bates Museum (Sample Education Component)**  
Hinckley, Maine

Project Type: Treatment

IMLS Award: \$21,305 (includes \$2,561 for education component)

Match: \$30,072

Total Project: \$51,377

Museum Budget: \$87,676

\$21,305 to treat four Charles D. Hubbard early 20<sup>th</sup> century dioramas of Maine's Kennebec River Valley mammal life and environments. \$2,561 to present a workshop on lighting issues in museums, place a related article on the Museum's website and statewide Museum's newsletter, prepare a temporary exhibit about the lighting issues and offer related programming and prepare a two page visitor handout.

**L. C. Bates Museum CPS Proposal Narrative**  
**Historic Charles D. Hubbard Mammal Diorama Treatment Project**

**1.What is the design of the project? Goals:** The project goal is to begin the conservation of the museum's exceptional Charles D. Hubbard mammal dioramas. The L.C. Bates Museum requests \$21,305 for extremely necessary professional treatment to conserve four unique, early 20<sup>th</sup> century, Charles D. Hubbard dioramas of Maine mammals and environments and related educational activities. This Mammal Diorama Treatment Project is designed to preserve the historic dioramas that have backgrounds painted by an American Impressionist artist and that represent an earlier method of American museum exhibition presentation and museum interior architecture. This project follows a successful CPS pilot project that restored 7 bird dioramas and tested the methods planned for this project and the treatment of 15 additional bird dioramas. This will start the restoration of the mammal dioramas. These four abutting dioramas are enclosed in one case so it seems natural to complete their treatment at one time.

**Objectives:** [1] To conserve for future generations four Charles D. Hubbard dioramas of the Kennebec River Valley mammal life and environments. [2.] To implement conservation methods tested in our pilot diorama treatment project. [3]. To install a data logger in the case interior to compare with a previously installed logger out side the case. [4]. To make the results of the project available to the public and other institutions through an exhibit, project PR, a MAM workshop and through activities proposed for the educational component. This project is prioritized by the Museum because of the dioramas' significance to the Museum's interior architecture and exhibit presentation and because of the almost daily educational utilization of the dioramas by visitors including school groups.

**Project Activities: (June 1, 2005-July 1, 2006) (Please see Conservators' treatment Plans for details.)**

1. In June- August 2005, Museum director, Deborah Staber, the project director will communicate with all project personnel to finalize the project details and timeline and order project materials. All project staff will supply or be provided with safety equipment which will be worn at all times working near the mounts.

2. As directed by the object conservator, staff will prepare the Museum's Mammal Gallery, Hubbard Hall for the project work. (Covering cases, closing the work area, arranging needed tables etc. for the conservators.) For the duration of the project, museum staff will be present in the mammal room, when work is in progress.

3. In August, all dioramas and their components will be photographed and the object conservator will take interior light levels. The volunteer photographer will photograph project activities for the project portfolio. In July and Aug 2005, the conservator assisted by the museum staff will test mounts for arsenic.

4. Present diorama lighting is historic and original. For long-term preservation, the interior light (see object conservators' treatment procedures for details) will be changed to LSI, fiber optics lighting with glass fibers that will go to a bar in the front and to the historic lighting. This lighting will retain the historic lighting effect within the dioramas, but reduce heat and light exposure. A Watt Stopper, a unit to light the dioramas only when visitors are in the room, will be installed to limit light exposure. The object conservator will install the fiber optics lighting. The electrician will remove old wiring not retained for its historic value, install the new wiring to the fiber optic projectors in conduit back 25 ft to the main box and a Wattstopper, as directed by the conservator in August 2005.

5. The case roofs will be built and installed (see Harvey's treatment Procedure) and case moldings will have minor repairs by the woodworker as directed by the conservator, to eliminate dust and close the cases. The wood worker will reproduce a small amount of broken molding and stain it as directed by the object conservator and build a small staging for the art conservator to use to access the paintings in the back of the dioramas without disturbing the mounts.

6. In October 2005, the old, fragile glass of the fronts in the dioramas will be replaced with safety glass by American Glass Company as directed by the object conservator. The glass and wood fronts will be taken to the museum maintenance room where this work will be completed to avoid dirt in the gallery. The object conservator's plan will oversee their reinstallation with an adhesive gasket material to the inside of the wood frames. This will greatly reduce dust and particulate infiltration into the diorama cases. CHR Pressure Sensitive Adhesive Tape Strip-N-Stick Silicone sponge 200A, 1/16" by 1" will be used.

7. In October 2005- January 2006, the art and object conservators will work together to preserve the 2 separated background panels. (Please see treatment plan for details) After the panel is treated, the object conservator, assisted by the Museum director, will clean and realign fur and examine the fur on the fox and raccoon mounts for the need of color gels, fill in tail fur on the fox, clean the cases, and diorama materials. The conservator will restore the fox's tail with appropriate synthetic fur that is adjusted to match the color of the original mount. The conservator will use a Hepa-filter vacuum, brushes and specialized tools to clean the mounts.

9. When the mounts and diorama cases are treated, the art conservator, Nina Roth-Wells, will clean the paintings. She will spend 11 days cleaning the diorama paintings, working with Ron Harvey to treat separated background panels described above and writing a treatment report. The painting treatment will involve dry cleaning with hepa-filter vacuum utilizing brushes and dry sponges. Working with the object conservator panels that have separated and come forward leaving a space will be secured back in place. Then the edges will have a covering of matte varnish such as Golden MSA matte varnish, the remaining separation will be filled with vinyl spackling compound or other similar reversible materials and the area will be inpainted with acrylic and gouache paints. (See Painting Treatment Plan) The art conservator will work from a custom built bridge/staging that will allow access to the back wall without disturbing the diorama objects. (The woodworker will build this staging designed by the conservator.)

10. The museum staff will install a Hobo data logger within one case to monitor temperature, relative humidity and light and that will be able to be downloaded from the exterior of the case through a cable. The case will be monitored for a full year to establish diurnal environmental conditions in the dioramas in the mammal room.

11. In April-July 2006, the museum and public will celebrate the restoration of the 4 mammal dioramas and reopen the dioramas to the public with an exhibit, family/children's tour/program and a MAM workshop about the lighting aspects of the project. (See educational component.) The museum director and staff will document the project with film, a project portfolio, write project reports and send press releases to Maine media.

The object conservator will spend 13 days at the museum working as described above and the art conservator 11 days at the museum and in her lab. The fees for labor for the American glass company are included in the estimate. The Good Will-Hinckley electrician will spend 20 hours on the project and the woodworker 3 days. The Museum director/project director will spend 10% of time for 12 months on the project coordinating activities, assisting the object conservator, supervising volunteers, writing final reports, and documenting the project through a project portfolio. The part time Museum staff will spend 10% of 12 months assisting with the project by freeing the director for the project and supervising volunteers. Volunteers will spend at least 800 hours and GWH youth 300 hours preparing the Mammal Hall for project, monitoring the work area, assisting the conservator, ironing on marvelseal, staining wood, photographing the project activities and assisting director to free her for project work.

The Schedule of Completion is appropriate because it is based on the time estimate of conservators and the woodworker who have completed the pilot diorama project and treatment project. The dioramas are located along the exterior west wall of the Museum's mammal room. (See floor Plan.) They are set in form the exterior wall by an air space, wooden wall and bracing. Rope barriers will close off this area during the project. When any activities that risk the safety of visitors or collections are being preformed, the entire room will be closed to visitors and unnecessary staff. Since the project will be completed mostly in winter, when the museum is only open by appointment, it will not affect visitation or visitor safety and staff will have time to devote to the project as part of their work schedule.

The preserved historic Maine mammal dioramas and the conservators' treatment report will be the main products of this project. For the accompanying educational exhibit and activities please see Educational Component.

Most objects in the room are in cases or framed behind glass; thus isolated from the project activities. Through the results of the pilot project, the object conservator concluded that most of objects should remain in place in the room. But, plastic covering will be placed over some cases as an extra precaution. All glass, wood and other materials will be cut or assembled at another location and brought to the site to limit the amount of dust in the air and hepa filter vacuums used by the conservators as they clean the specimens will draw possible dirt and toxins from the room. The conservators and trained staff will be the only people handling the diorama materials and will proceed as directed by the project conservator.

**2A. What are the proposed conservation methods and why are they conservationally sound?** The Treatment Project has been carefully conceived, in collaboration with the consultant conservators, who have extensive experience in similar projects, by reviewing the CPS funded 2000 detailed collections survey recommendations and by the results of our successful pilot diorama preservation and treatment projects. This conservation work conducted by professional conservators follows expected practices for providing treatment for museum mounted taxidermy and art objects. The project combines the efforts of an object and an art conservator to address issues of the varied elements of the dioramas. The partnering of the art and object conservators and their combined knowledge and experiences gained from the pilot project will make the project efficient and reliable.

In preparation for the pilot diorama preservation project, *SafetyWorks!*, Maine Dept. of Labor monitored Ron Harvey as he preformed a fauna cleaning and restoration in the Museum by the methods proposed for this project. They also monitored room air quality and preformed wipe tests in the work area. The sampling results found the levels of dangerous metals/chemicals below the level of detection. Project staff will wear safety equipment recommended by the conservators and *SafetyWorks!* .

**3. What are the objects, historic structures or specimens that are the focus of this project?** The L. C. Bates is a natural history and cultural museum located on the 2,450 acre rural campus of Good Will-Hinckley Homes for Boys and Girls. The Museum is surrounded by a natural outdoor area, including an arboretum and trail system, which complement the Museum's in-house Maine flora and fauna collections. The Museum's mission is to hold and conserve its collections and use its collections to provide public educational services.

The L.C.Bates Museum is truly a "museum of a museum". Specifically, it is a rural early 20<sup>th</sup> century museum that still retains its original exhibition presentation. Maine Historic Preservation Director, Earle Shuttleworth describes the Museum as "...a major Romanesque Revival building that houses Maine's most well-preserved museum interiors from the early 20<sup>th</sup> century." The museum's Hubbard dioramas, although timely today, represent early 20<sup>th</sup> century museum presentation. The artistically significant Hubbard dioramas are prime and complete examples of early dioramas and of museum heritage. They are the oldest natural history dioramas in Maine and among of the oldest still existing in New England. The dioramas are unique because an American impressionist painter painted them. Visitors, including museum professionals and museum studies students from local colleges, are pleased to find this example of an earlier museum. Our exhibition philosophy is to retain the original presentations as much as possible, but to conserve them and add non-intrusive interpretation to the exhibits. These dioramas are at a suitable height for viewing from a wheel chair, so they do not need to be altered to make ADA accommodations.

**This Treatment Project will preserve 4 historic natural history dioramas created and painted in 1923 by the American Impressionist painter, Charles D. Hubbard.** (Enclosed find catalog about Charles D. Hubbard) These are part of the 28 dioramas produced by Charles D. Hubbard located in the L. C. Bates Museum. The project will be the third phase of the restoration the Hubbard dioramas and begins the mammal diorama treatment. The dioramas are a composite of mounted animals, flora, wonderful painted backgrounds, wood cases with glass fronts and lighting elements. These dioramas, unusual because of their well painted impressionist backgrounds, are one-of-a-kind, and exemplify the early period of museum diorama construction and national museum exhibition history. They illustrate the evolution of the diorama and are in their original locations. These rare, surviving, historic dioramas depict the mammal life found in specific locations in inland Maine's Kennebec River valley as it looked eighty years ago. The specimens listed by diorama are: 1. Snowshoe Hare, European Hare, New England Cottontail and 2 woodchucks with a background painting "Near Pleasant Mt" ME, Three Beavers with a background painting of Sibley Brook, Canaan, ME, 3. Four Red Foxes, 2 adults and 2 pups with a background view from a campus trail looking east, and 4. Three raccoons in a corn field with background painting of the fields and woods along the Kennebec River. Natural preserved flora are part of the dioramas and two have rocks. (Please see the diorama photographs and treatment plan.)

These four dioramas line the outside west wall in the Mammal room. Each diorama is about 72" H by 63.5" W and 52" deep. (See floor plan) They are enclosed in a case that brings them up 20" from floor level. The case, really an element of the dioramas, is made of wood with glass fronts and was designed by Hubbard. The diorama backgrounds are painted in oil on commercially manufactured pressboard. Light in each diorama originally came from a 60-watt bulb in a tulip fixture lit by wires running, mostly out of site, along the case ceiling. (Now a 25 watt 12 volt bulb and the same wiring.) This is historic knob and tube wiring. Removing the front glass and wood panels accesses the dioramas. These are held in place by moldings with screws or nails. The diorama animals and paintings are very dirty and the cases have broken molding and the lighting is unsafe and damaging to the dioramas. Dust easily enters through the unsealed front panels and has built up overtime on the mounts and paintings. The dirt and light are leading to diorama deterioration.

Center to the museum's mission is education. The Museum is prime resource for teaching Maine natural history to our rural population and visiting tourists. Over 17,000 people, many school children visit the museum each year. New directions in school curricula [particularly the recently mandated Maine Learning Results for public schools] have greatly increased the importance and use of this resource by teachers. These dioramas are an important part of the museum's collections of Maine animals. The 28 dioramas support student and visitor understanding of the relationship of the animals to their unique habitats. The dioramas are also used by artists, children writing school reports, visitors learning to identify animals, woodcarvers, 4 college ornithology and vertebrate zoology classes, Scouts working on badges, scholars (14 in 2003), illustrators for children's books, researchers, photographers (33 in

2003) and more. In 2004, over 400 children drew these dioramas or made paper dioramas through a museum Summer Art Project. The collections are relevant to Maine's local, regional and national community for learning not only about Maine's natural environment, but also about past museum presentation, our museum heritage and for the backgrounds artistic merit. We are located on the Kennebec-Chaudiere International (French Heritage) Corridor, (US and Canada). The dioramas provide corridor travelers a look at the regional wildlife, landscape and habitats.

#### **4. How does the project relate to your museum's ongoing conservation activities?**

Daily public museum housekeeping, including cleaning the outside glass of the dioramas, is preformed by staff or supervised GWH museum studies students following the museum's housekeeping plan. Campus maintenance staff comes to the museum, when the director or staff identifies lighting, plumbing, etc issues that need their attention. Trained conservators are needed to perform the painting and mount treatments.

Some institutional history is necessary to understand the Museum's ongoing conservation activities. The three-story L. C. Bates Museum was founded in 1911 and its interior spaces completed in the 1920's. The Museum was active and open to the public until the 1950's when the parent organization, Good Will-Hinckley Homes for Children, became a college preparatory high school, at which time the Museum was closed to the public. In 1978 [after lengthy litigation], the Homes campus [including the L. C. Bates Museum] was returned to the administration of the Good Will Home Association, which operates the organization today for needy children. After years of neglect [1950 - 1978] the Museum needed a great deal of energy, professional information / conservation and funds to bring it up to present-day standards. Volunteers began renewing the Museum, in 1992 a full-time staff was hired, and the Museum Advisory Board developed long range plans. In 1993 the Museum conducted a MAP I and CAP, in 1995 the Museum had a MAP II, in 1998 a MAP III and in 1999-2000 a CPS Detailed Collection Survey of the mounted collections including the dioramas to help it develop and review conservation plans. 2001 and 2002 NEH Preservation Assistance Grants have provided funds for the CAP recommended storage improvements. A 2002-03 CPS funded the pilot diorama preservation project and a 2003 CPS funded mounted bird treatments and covers and in 2004 the treatment of the remaining 15 bird dioramas.

**The CAP recommendations, the CPS Detailed survey, a 2000 assessment of the diorama paintings by Williamstown Art Conservation and Museum board planning have lead us to make the diorama project our museum's greatest collection care need at this time.** The results of the CAP led to the Museum making conservation the top priority, first focusing on improving the building [an artifact itself] in order to improve collections conditions. Since 1993 the Museum has done the following mostly CAP-recommended structural / environmental improvements: Beginning in 1994 collections long range plans have dealt with issues of humidity, mold, light levels, storage, air quality, pests, and handling, cataloguing, caring and cleaning of objects. The expansive roof covering was replaced, the skylights were repaired, glass replaced, and fabric now reduces light coming in the skylights, 71 windows were fitted with room-darkening shades and some have UV permanent covering, 91 windows were repaired, glazed and repainted, and in 7 window sashes were duplicated and replaced. The building's brickwork was repointed, the chimney was rebuilt, and the terra-cotta mantel on the first floor was restored, Paint has been analyzed [with no lead paint found], and a handicapped accessible ramp was placed at the rear of the building, In 2003 -2004 the museum changed the historic knob and tube wiring and lights to a 12 V system that still works and is an exhibit of early lighting and placed track lighting with UV filters and special lenses around the exterior of the galleries, Safety and exit paths were determined, Using reproduced molding parts, the front entrance was restored, and the floor under the front entrance was reinforced to handle heavy traffic, all rooms are now monitored for pests, light, humidity and temperature, and 4 de-humidifiers were placed on the lower floor. Plumbing pipes and drainage pipes were rerouted away from collections and updated. Volunteers cleaned cases and storage areas and 3 locked archival/object storage areas were developed. (2,100 sq.). Over 40 cases or room doors were made secure with locks, and a fence was built in the carriage display area to keep the public back from the collection. 21 exhibition cases were repaired and 129 large pieces of glass in the cases were replaced with safety or plexi-glass. On-set data loggers monitor most museum rooms, and 2001 and 2003 preventive preservation projects in our storage moved hundreds of objects into acid free box storage. In 2003-4, we placed 24 covers that were made to look like the old cases over exhibited mounted birds and preserved 15 dioramas in the Audubon Room. This is the next phase in the preservation of the Museum dioramas.

In addition ....Staff and volunteers attended MAM and NEMA conferences and workshops and hosted 6 MAM conservation workshops to enhance their knowledge of collections care. Funding for conservation was obtained from foundation grants, Maine New Century Grants and Maine Archives Historic Record Grants, Good Will - Hinckley support, and many small individual donors. The thousands of GHW archival documents, photographs, works on paper,



and many object collections were stored archivally, in acid free housing, on powder coated metal shelving. As recommended by our 2000 CPS, a conservation space with a freezer, air filter, and workspace was developed. Three large oil paintings were assessed and treated by conservators. The Museum developed and implemented a collections policy, housekeeping plan for public and collection spaces, a disaster management plan, and an integrated pest management plan. The volunteer package, up-dated in 2003 includes collections care and safety information. Outdoor collections and the historic nature trails with monuments [some to leaders of the Outdoor Movement] were assessed by a land use study group of volunteer professionals and a Radcliffe Graduate School Landscape Design class. Using the Radcliffe materials, a landscape designer developed and mapped Museum and arboretum landscape plans. Paths, 3 monuments and a 1920's walking bridge were preserved. And many more projects have conserved the museum collections.

The community has come to use the revitalized Museum as a resource, and attendance has grown from about 400 visitors in 1991, to over 17,000 in 2003. (An additional 12,000 are reached through outreach programming.) Now, with many major structural improvements completed or planned, and public interest mounting, the Museum is focusing on its collections by taking a detailed look at them and meeting their conservation requirements. Storage has been upgraded with powder-coated shelving, acid free housing, and labeled storage units. The collections are being cataloged on Past Perfect NT Soft-ware. A museum, campus and community task force has developed a plan and had an architect make drawings and specs for a museum addition that will include the needs for additional climate controlled collection storage and public spaces.

**The Mammal Room historic dioramas are our most prioritized object conservation need of our 2003-2008 Strategic Plan. (See summary attached.) The Diorama Treatment Project will begin the preservation of the mammal gallery dioramas. The project is important because of the value of their artistic and historic merit and their support of the Museum's education mission.** The mounts are examples of early taxidermy, and illustrate the more individualized period before the use of uniform plastic internal forms for mounts. In 1999 –2000 as part of a detailed collection survey of the fauna objects at the Museum, conservator Ron Harvey examined 28 Maine natural history dioramas. The dioramas were surveyed for condition of: the animals; the paintings; the natural materials; case condition; and lighting. The unique Hubbard dioramas are a major Museum exhibit and in great need of conservation to prevent deterioration caused by light, heat, and dirt. Two of the early taxidermy animals were done for the Museum by Ward, a nationally known taxidermist, but most by local taxidermists.

The Museum's financial commitment to the project includes staff salaries, GWH Student work/study time, volunteer time, electrician's fees and materials, housing and meal costs for conservators, glass, and safety and testing equipment, film and project materials. Long term, the Museum is committed to working toward the conservation of the all its collections, including the dioramas, through professional assessments, careful planning and partnering with conservators. The completed mammal diorama project will be a tool to support developing efficient diorama restoration plans for the much larger museum mammal dioramas and supporting fund raising for professional conservation of additional dioramas.

**5. What are the anticipated benefits of this project?** The results will provide immediate and long term benefits to visitors, the Museum, and the museum field. The project will preserve the unique Hubbard dioramas for future generations of visitors including museum historians, artists, scholars and school children. The Diorama Treatment will conserve an important Museum display/artifact and enable staff, advisory board members and conservators to plan, prioritize and undertake identified future conservation of the large mammal dioramas. It will help all staff, members, volunteers and visitors take pride in and value our Museum's conservation efforts.

The Diorama Treatment Project (See Educational Component) will benefit the Museum's constituencies by enhancing the preservation of the collections and through articles, an exhibit, docent talks etc. that explore the diorama lighting preservation issues. The Museum's audience includes rural, local and regional audiences who have little access to these specific types of collections (dioramas) and the educational services they provide. The Museum, its collections and this treatment project provide knowledge-based, career prep Museum Studies Program opportunities for the Good Will - Hinckley at-risk youth. The dioramas also serve the seasonal and tourist visitors to Maine by enhancing their understanding of the Maine wilderness environment and its animals. The Treatment Project portfolio will be available to other museums and organizations with dioramas conservation needs and to the Maine Museum community through a MAM workshop and article focusing on the diorama lighting.

**6. How will the applicant insure that ongoing museum functions are not inhibited by project activities?** Thoughtful planning will minimize the impact of the project on ongoing Museum functions. The Museum is strongly

committed to developing and implementing sound, professional building and collections conservation and preservation practices. The project is a priority of the Museum's long range conservation plan and recommended by our 2000 CPS survey. One function of the staff is to conduct, and participate in, special projects such as this. The Mammal Diorama Treatment Project will be considered a normal and necessary part of the workload. The project will also offer professional development opportunities to staff and volunteers involved in assisting the conservator.

The major activities are scheduled for late fall/winter when the Museum's open hours, visitation and programming are low, to avoid disrupting daily Museum activities. Good planning will insure effective use of staff and volunteer time, and the planned availability of volunteers to cover any unexpected Museum activities will insure that staff is free to devote time solely to the project during the conservator's and other participants work schedule. The Museum's annual budget for staff time and collections care, and annual staff time commitment to object care, are adequate to aid in the support of the Diorama Treatment Project. The Museum's large [43 member] volunteer workforce, ASPIRE Volunteer [1] and the Museum's Good Will - Hinckley museum studies students [7] will provide sufficient volunteer support for all parts of the project.

**7. How does the project budget support the project goals and objectives?** The Museum director [also project director], using Ron Harvey's CPS Detailed Survey and treatment plan, Nina Roth Wells Treatment Proposal, and the outcomes of the pilot diorama preservation project in consultation with the project conservators and Museum Advisory Board, developed the Diorama Treatment Project budget. The pilot diorama project and the conservators' experience with similar treatments allowed them to make a reliable estimate of the professional time needed for the conservation work for both the consultants and Museum staff. Project estimates for glass and woodwork costs were received from three equally qualified sources. We chose the most cost efficient. The electrician employed full time by the parent organization and is familiar with the Museum's wiring will provide the electrical services and materials needed as part of our match. Conservators, Nina Roth-Wells and Ron Harvey live in Maine about 1.5 hours drive away so travel costs are low and included as part of their daily fee. The Museum will provide their housing. Conservators, Nina Roth-Wells and Ron Harvey, provided the survey and the treatment work for the pilot and phase 2 treatment bird diorama projects. We feel this makes these conservators ideal and cost effective for this project.

The project's main expenses are conservators, wood workers and electricians fees, materials fees for glass, diorama case conservation materials, safety and monitoring equipment and staff and volunteer time. The consultant fees are based on standard fees for on-site conservation work, food and lodging and writing the treatment reports. Equipment fees are derived from current catalogue/supplier prices. Staff and volunteer costs are based on salaries and the hourly time estimated to complete the project or local building suppliers. Salaries for volunteers are based on Maine Planning Office publication, Assessing Volunteers Value in Maine. IMLS funds will support most of the costs of the conservator's time and some needed supplies. The Museum will support costs of conservator housing and food, staff and volunteer time, electrician time, supplies, film, space, safety equipment and 1 data logger and indirect costs will cover mailing, telephone copying, vacuum bags, etc.

**8. What are the qualifications of the project personnel?** **Object Conservator:** Ron Harvey has extensive experience conserving and surveying natural history mounted specimens. He worked as head of conservation for nine years in the Milwaukee Public Museum. He completed a detailed natural history survey and pilot diorama treatment project. He has made an assessment of the conservation needs of the dioramas in 2000 and with the project director and with input from technical advisors/product distributors has helped plan the project activities. He will be responsible for treating the specimens and diorama materials other than the paintings. His plan will direct the electrician and the wood worker in the conservation of the diorama cases. He and the project director will work to oversee that the project is implemented as planned. **Project Director:** Deborah Staber [B.A. in Social Sciences] has worked at the Museum for 13 years, overseeing and participating in numerous grant projects for educational programming and conservation or preservation of the Museum building and collections. These include CAP, a Detailed Collection Survey mounted materials and MAP I, II and III. She has attended NEMA and MAM conservation workshops. At the 2003 NEMA conference she was part of a panel talk on diorama preservation. From 1993 to 2003 she served on the MAM council and wrote a volunteer column for the quarterly MAM newsletter. She will serve as project director and assist the conservators and organize the volunteer support as needed. **Art Conservator:** Nina Roth-Wells, (Bowdoin College and Masters in Art Conservation Specializing in Painting- Queens University), Her work on the diorama restoration at the Maine State Museum and in the field of art conservation makes her well qualified to complete the treatment of the diorama paintings in coordination with the object conservator, Ron Harvey.

## L.C. Bates Museum Project- Lighting For the Dioramas and Collections

### Educational Component – Narrative Questions

**1. What is the design of the Educational Component?** Our Audubon and Mammal galleries with their 1920 natural history dioramas illustrate an earlier form of museum exhibit presentation. Taken as a whole, the galleries and their exhibits exemplify interior museum architecture, artistic craftsmanship and the scientific and societal thinking of the early 20<sup>th</sup> century. Specifically, our dioramas and Museum interiors illustrate the philosophy represented by our founder George Walter Hinckley, a Progressive who was a childcare reformer and avid naturalist. The entire museum and most of its collections and exhibits were produced between 1915 and 1925. The L.C. Bates Museum is truly a “museum of a museum”. Maine Historic Preservation Director, Earle Shuttleworth describes the Museum as “...a major Romanesque Revival building that houses Maine’s most well-preserved museum interiors from the early 20<sup>th</sup> century.” This project focuses on the diorama historic wiring and lighting fixtures.

Our Diorama Treatment projects have allowed us to work with the object conservator to determine the best lighting for the dioramas. Along with the diorama lighting, we have improved the lighting in public space in the museum galleries for the protection of objects, to meet new 2003 electrical codes and for improved visitor experience. Until recently, its original knob and tube wiring lighted the museum. The historic wiring in most places is visible to the visitor because it was placed on the outside of the walls. Visitors love the original knob and tube wiring and lighting system. One in three visitors asks about the wiring. To preserve the old wiring and the historic interior of the museum, most of the wiring and lighting has been changed to a 12 V system that is safe even if visitors touch it and meets new 2003 lighting codes. The 12 V does not produce enough light to light the galleries, but does preserve the old lighting system and fixtures as a historic exhibit and element of the original museum interior.

In the dioramas, the lights and wiring are being preserved for exhibit purposes, but fiber optic lighting will light them. The bulbs in the original fixtures have their ends drilled out so that the optic fibers can be placed inside the bulb. Some will have addition fiber optic side lighting. In the galleries LSI track and wall lighting has been placed high around the outside of the rooms so that it does not interfere with the visitor’s sense of the old lighting and museum historic exhibit presentation. The new LSI lighting has UV filters, dimmers, lenses that spread and spot light, and in areas with sensitive collections is activated when people are in the gallery. This lighting improves the lighting for collections and for visitors. The light levels are adjusted to be appropriate for the collections they light. The Museum lighting was developed with input from Gregg Williams, the Assistant Director Colby Collage Art Museum, who handles the lighting of their exhibits and conservator, Ron Harvey. The Museum staff and board collaborated with the campus Head of Maintenance, the campus electrician and a lighting/planning expert from LSI to finalize and implement the gallery lighting plan. Conservator, Ron Harvey planned and installed the diorama lighting.

***Our Lighting For Dioramas and Collections educational project goal is to explain the issues of light deterioration and lighting to visitors and other museums and to share the techniques the Museum employed to improve our lighting, while still retaining the Museum’s historic presentation.*** We hope community visitors will gain information about protecting their personal historic documents, photographs and objects from light damage and new lighting codes and that other museums will learn from our experience. It is anticipated our educational component will expand visitor’s and other Museum’s knowledge of light deterioration and lighting preservation issues. ***Lighting For Dioramas and Collections project*** is designed to help visitors examine the problems of light deterioration and the lighting techniques used in the preservation of the dioramas and in the museum through the following educational objectives/activities:

**A. *MAM Spring Workshop on Lighting Issues in Museums.*** This daylong MAM (Maine Archives and Museums) workshop will tour the preserved dioramas to see their lighting and to see the overall new Museum quality lighting in Mammal Room. It would examine the issues of light damage and the issues of the historic wiring. It will also outline the preservation process, materials and techniques used in the diorama treatment and gallery project. The Conservator, Ron Harvey will be the main presenter for the workshop.

**B. *A Lighting For Dioramas and Collections Program,*** family hands-on activity and guided tour of the lighting in the museum. The *Lighting for Dioramas and Collections* program will be available to present at other museums or organizations. We have found that many museums and homeowners were affected by the new electrical codes in 2003. These were a factor leading the museum to preserving, but also upgrading our wiring. The old Knob and Tube wiring does not meet new codes. Our historic wiring was safe and pasted by the State Fire Marshall, but in a few places near switches it was felt it might be torn or moved by a visitor. (Changing it to 12 V means a visitor might disturb it without being hurt.) Our diorama and gallery lighting projects have already helped several local Museums, including The

Fairfield History House, and regional homeowners facing decisions about their Knob and Tube wiring and meeting new electrical codes and insurance requirements.

C. *Article on the L. C. Bates Lighting the Museum and Dioramas* will be placed on the Museum Website

D. A more technical *L.C.Bates Museum Lighting Article will be sent to the MAM Newsletter*

E. PR about the museum lighting project and the lighting program and exhibit will be sent to Maine Media

F. *A 3 panel (18 linear Foot) temporary exhibit* that will open with the MAM Lighting workshop and that examines the following issues; [1.] lighting as an element of deterioration, [2] the Museum issues with lighting the dioramas and historic wiring and [3] the process and results of the Museums re-wiring project including the dioramas lighting and gallery lighting. The exhibit will run from April to October 2006 and be in our South Gallery on the first floor, near interesting examples of the early wiring and historic lighting fixtures. The exhibit will include samples of the new and old wiring and lighting materials and lenses etc., the lighting plan and drawings, photos and text about the early lighting system, the Museum's lighting issues and their solutions. It will include information on the diorama lighting fixture preservation and new fiber optic lighting.

G. A brief *docent script* and 2 page visitor handout (10,000 copies of the MAM Newsletter article with photos) that together provide the basic facts of lighting in collections, light damage and the preservation lighting. The script will encourage visitors' discussion and questions as it guides the visitor through the process for preserving and upgrading the Museum and diorama lighting. The Museum staff using information gained through the lighting projects will develop this project. This will be included in the Museum Docent Training Guide.

H. *Project publicity* will include: PR, exhibit invitations (500), exhibit posters (400), and MAM workshop brochures produced by MAM. Ron Harvey the object conservator will spend 1 day presenting at the MAM workshop. Museum staff and volunteers will develop the exhibit, docent script, visitor handout, etc. based on the diorama lighting preservation project completed by the conservator and lighting experts. The project director, Deborah Staber will spend 5% of 12 months on this project. She and the Museum Board will monitor the timely completion of the project activities. She will also oversee the other project activities and reports. The museum assistant will spend 5% of 12 months and qualified volunteers and museum studies students will spend over 800 hours on this project. They will assist with the exhibit construction, dry-mounting labels and photographs, docent script development, tours of project work and lighting, and work as needed to free the project director. Yearly the museum makes temporary art and /or humanities exhibits that use similar skills, so our staff and volunteers, including people who work fulltime in marketing, education, graphics, art and carpentry are qualified to create this exhibit. Our museum assistant will supervise the Good Will museum studies students helping with the project, organize the volunteers and fill in for the museum director to free her for the project.

**Evaluation:** This project's educational activities will be evaluated subjectively through MAM workshop participant surveys and docent and visitor feedback reviewed by the project director and museum board. The activities will be evaluated objectively by recording the number of program participants. An outside expert, Julia Hunter, Registrar of the Maine State Museum, will assess the program, handouts, exhibit and other project educational activities. She will spend ½ day reviewing the materials and ½ day writing an evaluation report. Her evaluation will help the museum assess any needed program changes and provide an evaluation for the final report.

The schedule of completion plan is based on the time we have devoted to similar program development. This will be one of our yearly three new exhibit/programs and thus part of the expected workload for staff and volunteers.

**2. What are the anticipated benefits of the educational program?** The objective is to reach varied audiences through the above well-researched education activities that will be developed in consultation with the conservator, staff and qualified volunteers. It is anticipated the audience for this project will include students, tourists, museum members, staff, board and volunteers, community members, and the Maine museum community. The program activities will be designed to facilitate visitors' exploration of the museum's historic and new diorama and gallery lighting, the rationale for our lighting improvements, and the lighting preservation process. Our rural audiences are often new to conservation practices. It is anticipated the preservation and educational project will increase public understanding of lighting issues including: object deterioration caused by light, methods of improving lighting in Museums, simple preventive preservation practices such as drawing shades or placing UV filtering material in windows, IMLS CPS Grant funding for conservation and the roles of the electrician, lighting company and conservator in designing the lighting. Many visitors who have old knob and tube wiring will be informed about the new codes determining its use.

We feel the exhibit, article and program will also be used in our ongoing museum collections care and museum studies programs. This program and article will compliment the present on-going Museum programs; *Preserving Mounted Fauna Collections: Preservation and Safety Consideration*, *Summer Wednesday Afternoon Museum Studies Video* and

*Discussions and our Very Young Conservators Program. Our museum has made a concerted effort to teach our museum staff and volunteers, at-risk students, children, college interns and our community about the issues of collections care. We have presented numerous, well attended MAM workshops, summer Wednesday Afternoon Drop-in Museum Studies video and discussion programs, preservation classes for local SAD adult education and genealogy societies, and programs about conservation that address needs of Girl Scout Badges and Science and Technology school Learning Results. The MAM workshops are effective for presenting conservation concepts and processes to Maine's rural often all volunteer museums. Since 2000, we distributed over 20,000 copies of three Museum notes written by Ron Harvey on natural history collections preservation. As a result, it is anticipated 10,000 project handouts will print and offered to visitors. The handout information will be posted on our website to help us reach a broader audience.*

The out-side evaluation will be a resource for board and staff planning for future educational programs about conservation issues. The outcomes for our general audience will be the program, handout article, web articles, etc. that provides lighting conservation information. Many local visitors and tourists from away express curiosity about the many past and ongoing museum preservation projects. Visitors and local media seem to like an "insiders" look at the activities that are revitalizing the museum. Visitors MAP III and other exit surveys have included many comments about the value of maintaining the historic exhibit presentation and ideas for preserving the museum. The educational activities will offer visitors an opportunity to explore in detail conservation issues associated with preserving and up-grading historic wiring for better collections care.

**3.How does the project budget support the educational component goals and objectives?** For developing and presenting a small panel exhibit, written materials and related programming with potential to reach diverse audiences, these are judicious costs. The costs are reasonable and appropriate because they are based on development expenses for similar past exhibits with associated programming and on estimates of direct and indirect costs for exhibit preparation, materials for interactive activities, mailing, publicity, telephone etc. and our many expert volunteer efforts. Staff and volunteers will continue their on-going research on lighting issues and codes to assure we present the latest information to the public. There will be expenses for 400 (\$146) exhibit posters to place in local stores and information sites, 500 (\$213) post card invitations, film and developing \$85 and \$90 for the exhibit title graphics. Also, it will cost \$700 to print 10,000 handouts. Also, the museum expenses will include \$661.00 for the exhibit materials and hands-on activity.

The costs of the conservator to present the MAM workshop on lighting (\$600) and the evaluation consultant (\$300.00) are based on their estimates, which in turn are based on their work on similar projects. As an educational museum, the L.C. Bates Museum staff is repeatedly developing programs for the public, and is familiar with the time involved to create an interesting and informative public exhibit with programming and with the kinds of visual materials needed to inculcate the information, encourage audience participation, and address different learning styles. The materials and informational handout copying costs are based on estimates from the local businesses. The Good Will-Hinckley Homes, the museum parent organization provides technical staff support for placing materials on the web site and postage.

Much of the budget's match is in-kind work of the staff and volunteers. These development activities will be done when museum activities are light in winter and early spring. The program trained to docents will be part of the their visitor tours. The museum's match will also provide funds for program materials, additional presenters, refreshments, and handouts for the MAM workshop, some exhibit materials, visitors' lighting program and hands-on supplies such as light meter, light testing paper, samples of safe lighting equipment, and UV filtering materials.

**4.What are the qualifications and responsibilities of the project personnel?** **Conservator:** Ron Harvey, (1 day) present the MAM workshop. He has successfully assisted the Museum in developing Museum Studies Curriculum for at-risk youth and notes on safety issues with mounted collections. He has published numerous articles on collections care and projects, (See attached Resume). He has presented many conservation papers at professional conferences. He has presented MAM Workshops and with museum staff participated on a panel about our pilot diorama project at the 2003 NEMA fall conference. **Project Director:** Deborah Staber, Museum Director has overseen the development of over 40 museum programs, catalogs and exhibits. Exhibits she curated include Empty Barns and Abandoned pastures, A Story of Childcare, Chore Doing, and The Art Of Somerset County. She has developed, promoted and presented the Museum's education services and programs for diverse audiences. She is project director for the Good Will student Museum Studies Program. She has presented at and participated in 6 MAM workshops and 3 NEMA conference workshops and written regular articles for the MAM Newsletter. **Profession Evaluator:** Julia Hunter, Registrar at the Maine State Museum, where she has also served as curator of Fine Arts, educational consultant, Graphic Arts and Archives curator; **Manager of Cultural Resources Information Center [CRIC];** Outreach and Publications Coordinator; and Museum Educator. She will review and write an assessment of the exhibit, educational materials, docent script and articles.



# Project Budget Form

## SECTION 2: CONSERVATION DETAILED BUDGET

Year ☒ 1 ☐ 2 ☐ 3 - Budget Period from 06 / 01 / 2005 to 06 / 30 / 1006

Name of Applicant Organization L.C.Bates Museum

IMPORTANT! READ INSTRUCTIONS ON PAGES 3.3-3.5 BEFORE PROCEEDING.

### SALARIES AND WAGES (PERMANENT STAFF)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
	(1)	10% of 1 year, \$28,500		\$2,850	\$2,850
	(1)	10% of 1 year, \$7,000		\$700	\$700
	(6)	800 hours at \$9 per hour		\$7200	\$7200
	(4)	300 hours at \$6.25 per hour		\$1,875	\$1,875
<b>TOTAL SALARIES AND WAGES</b>			\$	\$12,625	\$12,625

### SALARIES AND WAGES (TEMPORARY STAFF HIRED FOR PROJECT)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
	( )				
	( )				
	( )				
	( )				
<b>TOTAL SALARIES AND WAGES</b>			\$		

### FRINGE BENEFITS

RATE	SALARY BASE	IMLS	APPLICANT	TOTAL
25% of \$ 2,850			\$712.25	\$712.50
% of \$				
% of \$				
<b>TOTAL FRINGE BENEFITS</b>		\$	\$712.25	\$712.50

### CONSULTANT FEES

NAME/TYPE OF CONSULTANT	RATE OF COMPENSATION (DAILY OR HOURLY)	No. of Days (or hours) on project	IMLS	APPLICANT	TOTAL
	\$600 per day	13	\$7,800		\$7,800
	\$500 per day	11	\$5,500		\$5,500
<b>TOTAL CONSULTANT FEES</b>			\$ \$13,300		\$13,300

### TRAVEL

FROM/TO	NUMBER OF: PERSONS DAYS	SUBSISTENCE COSTS	TRANSPORTATION COSTS	IMLS	APPLICANT	TOTAL
Con to Hinckley	(1) (13)	\$780	0		780	\$780
Wells to Hinckley	(1) (11)	\$660	0		\$660	\$660
	( ) ( )					
	( ) ( )					
<b>TOTAL TRAVEL COSTS</b>				\$	\$1,440	\$1,440

# Project Budget Form

## SECTION 2: CONSERVATION DETAILED BUDGET CONTINUED

 Year ☒ 1 ☐ 2 ☐ 3

### MATERIALS, SUPPLIES AND EQUIPMENT

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
	Est. from LSI	\$4,580		\$4,580
Art Conservators Supplie	Catalog costs	\$42.75		\$42.75
Object Con Supplies	Cat Prices	\$461.25	\$160	\$621.25
<b>TOTAL COST OF MATERIALS, SUPPLIES, &amp; EQUIPMENT</b>		\$5084.	\$160	\$5,244

### SERVICES

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
	\$90 per day	\$360		\$360
	\$20 per hour, 15 hours		\$300	\$300
Film and developing	Elm City Photo Est.		\$85	\$85
<b>TOTAL SERVICES COSTS</b>		\$360	\$385	\$745

### OTHER

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Glass Replacement	American Glass Est		\$569	\$569
Lumber for case	Woodworker est./lumber quote		\$317.50	\$317.50
Safety Equipment	Catalog Prices		\$39.90	\$39.90
<b>TOTAL OTHER COSTS</b>		\$	\$926.40	\$926.40

<b>TOTAL DIRECT PROJECT COSTS</b>	\$ 18,744	16,248.65	\$34,992.65
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### INDIRECT COSTS

Check either item A or B and complete C. (See section on Indirect Costs, pages 3.4–3.5.)

Applicant organization is using:

- ☒ A. An indirect cost rate which does not exceed 15 percent of modified total direct costs charged to IMLS.
- ☐ B. Federally negotiated indirect cost rate (see pages 3.4–3.5).

Name of Federal Agency

Expiration Date of Agreement

Rate base amount

\_\_\_\_\_ 15 % of \$ 16,248.65 = \$ 2,437.30

IMLS

APPLICANT

TOTAL

**C. TOTAL INDIRECT COSTS**

\$

2,437.30

2,437.30

# Project Budget Form

## SECTION 2: CONSERVATION DETAILED BUDGET

Year ☐ 1 ☒ 2 ☐ 3 - Budget Period from 06 / 01 / 2006 to 07 / 01 / 2006

Name of Applicant Organization L.C.Bates Museum

IMPORTANT! READ INSTRUCTIONS ON PAGES 3.3-3.5 BEFORE PROCEEDING.

### SALARIES AND WAGES (PERMANENT STAFF)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
	(1)	30 hours at \$13.70		\$411	\$411
	( )				
	( )				
	( )				
TOTAL SALARIES AND WAGES			\$	\$411	\$411

### SALARIES AND WAGES (TEMPORARY STAFF HIRED FOR PROJECT)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
	( )				
	( )				
	( )				
	( )				
TOTAL SALARIES AND WAGES			\$		

### FRINGE BENEFITS

RATE		SALARY BASE	IMLS	APPLICANT	TOTAL
	% of \$				
	% of \$				
	% of \$				
TOTAL FRINGE BENEFITS			\$		

### CONSULTANT FEES

NAME/TYPE OF CONSULTANT	RATE OF COMPENSATION (DAILY OR HOURLY)	NO. OF DAYS (OR HOURS) ON PROJECT	IMLS	APPLICANT	TOTAL
TOTAL CONSULTANT FEES			\$		

### TRAVEL

FROM/TO	NUMBER OF: PERSONS DAYS	SUBSISTENCE COSTS	TRANSPORTATION COSTS	IMLS	APPLICANT	TOTAL
	( ) ( )					
	( ) ( )					
	( ) ( )					
	( ) ( )					
TOTAL TRAVEL COSTS				\$		



# Project Budget Form

## SECTION 2: CONSERVATION DETAILED BUDGET CONTINUED

 Year ☐ 1 ☒ 2 ☐ 3

### MATERIALS, SUPPLIES AND EQUIPMENT

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
<b>TOTAL COST OF MATERIALS, SUPPLIES, &amp; EQUIPMENT</b>		<b>\$</b> _____	_____	_____

### SERVICES

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
<b>TOTAL SERVICES COSTS</b>		<b>\$</b> _____	_____	_____

### OTHER

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
<b>TOTAL OTHER COSTS</b>		<b>\$</b> _____	_____	_____

<b>TOTAL DIRECT PROJECT COSTS</b>	<b>\$</b> _____	<b>\$411</b>	<b>\$411</b>
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### INDIRECT COSTS

Check either item A or B and complete C. (See section on Indirect Costs, pages 3.4–3.5.)

Applicant organization is using:

- ☐ A. An indirect cost rate which does not exceed 15 percent of modified total direct costs charged to IMLS.  
☐ B. Federally negotiated indirect cost rate (see pages 3.4–3.5).

 \_\_\_\_\_  
 Name of Federal Agency

 \_\_\_\_\_  
 Expiration Date of Agreement

Rate base amount

\_\_\_\_\_ 15 % of \$ \_\_\_\_\_ 411 = \$ \_\_\_\_\_ 61.65

	IMLS	APPLICANT	TOTAL
<b>C. TOTAL INDIRECT COSTS</b>	<b>\$</b> _____	<b>61.65</b>	<b>61.65</b>

# Project Budget Form

## SECTION 2: EDUCATION DETAILED BUDGET

Year ☒ 1 ☐ 2 ☐ 3 - Budget Period from 06 / 01 / 2006 to 06 / 30 / 2006

Name of Applicant Organization L.C.Bates Museum

IMPORTANT! READ INSTRUCTIONS ON PAGES 3.3-3.5 BEFORE PROCEEDING.

### SALARIES AND WAGES (PERMANENT STAFF)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
	( 1 )	5% of \$28,500=		\$1,425	\$1,425
Museum Assistant	( 1 )	5% of \$21,500=		\$1,075	\$1,075
Museum Vol & Students	( 1 )	800 hours at \$8.00 per hr		\$6,400	\$6,400
	( )				
<b>TOTAL SALARIES AND WAGES</b>			\$	\$8,900	\$8,900

### SALARIES AND WAGES (TEMPORARY STAFF HIRED FOR PROJECT)

NAME/TITLE	No.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
	( )				
	( )				
	( )				
	( )				
<b>TOTAL SALARIES AND WAGES</b>			\$		

### FRINGE BENEFITS

RATE	SALARY BASE	IMLS	APPLICANT	TOTAL
2% of \$	1,425		\$356	\$356
% of \$				
% of \$				
<b>TOTAL FRINGE BENEFITS</b>		\$	\$356	\$356

### CONSULTANT FEES

NAME/TYPE OF CONSULTANT	RATE OF COMPENSATION (DAILY OR HOURLY)	No. OF DAYS (OR HOURS) ON PROJECT	IMLS	APPLICANT	TOTAL
	\$600 per day	1 day	\$600		\$600
	\$300 per day	1 day	\$300		\$300
<b>TOTAL CONSULTANT FEES</b>			\$	\$900	\$900

### TRAVEL

FROM/TO	NUMBER OF: PERSONS DAYS	SUBSISTENCE COSTS	TRANSPORTATION COSTS	IMLS	APPLICANT	TOTAL
Augusta/Hinck	( 1 ) ( 1 )	\$10.00	\$23.30	\$33.30		\$33.30
	( 1 ) ( 1 )	\$10.00		\$10.00		\$10.00
	( ) ( )					
	( ) ( )					
<b>TOTAL TRAVEL COSTS</b>				\$	\$43.30	\$43.30

# Project Budget Form

## SECTION 2: EDUCATION DETAILED BUDGET CONTINUED

 Year ☒ 1 ☐ 2 ☐ 3

### MATERIALS, SUPPLIES AND EQUIPMENT

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
See Budget Justification				
Exhibit supplies Supplie	Costs of Catalog or store	\$681.73		\$681.73
<b>TOTAL COST OF MATERIALS, SUPPLIES, &amp; EQUIPMENT</b>		\$ 681.73		\$681.73

### SERVICES

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
CBS Copying	7cents a 2 sided pg X10,000	\$700		\$700
CBS Copying	400 Posters X 36.5Cents	\$146		\$146
Web Site Tech	\$30 per hour 1 hour		\$30	\$30
<b>TOTAL SERVICES COSTS</b>		\$ 846	\$30	\$876

### OTHER

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
Graphic for Exhibit Title	Felder Sign Shop price	\$90		\$90
<b>TOTAL OTHER COSTS</b>		\$ 90		\$90

<b>TOTAL DIRECT PROJECT COSTS</b>	\$ 2,561.03	\$9,286	\$11,847.03
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### INDIRECT COSTS

Check either item A or B and complete C. (See section on Indirect Costs, pages 3.4–3.5.)

Applicant organization is using:

- ☐ A. An indirect cost rate which does not exceed 15 percent of modified total direct costs charged to IMLS.  
☐ B. Federally negotiated indirect cost rate (see pages 3.4–3.5).

Name of Federal Agency

Expiration Date of Agreement

Rate base amount

15 % of \$ 9,286.00 = \$ 1,392.90

	IMLS	APPLICANT	TOTAL
<b>C. TOTAL INDIRECT COSTS</b>	\$	\$1,392	\$1,392

# Project Budget Form

## SECTION 2: EDUCATION DETAILED BUDGET

Year ☐ 1 ☒ 2 ☐ 3 - Budget Period from 06 / 01 / 2006 to 06 / 30 / 2006

Name of Applicant Organization L.C.Bates Museum

IMPORTANT! READ INSTRUCTIONS ON PAGES 3.3-3.5 BEFORE PROCEEDING.

### SALARIES AND WAGES (PERMANENT STAFF)

NAME/TITLE	NO.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
	( 1 )	\$13.70 per hour 15 hrs		\$205.50	\$205.50
	( )				
	( )				
	( )				
TOTAL SALARIES AND WAGES			\$		

### SALARIES AND WAGES (TEMPORARY STAFF HIRED FOR PROJECT)

NAME/TITLE	NO.	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
	( )				
	( )				
	( )				
	( )				
TOTAL SALARIES AND WAGES			\$		

### FRINGE BENEFITS

RATE		SALARY BASE	IMLS	APPLICANT	TOTAL
	% of \$				
	% of \$				
	% of \$				
TOTAL FRINGE BENEFITS			\$		

### CONSULTANT FEES

NAME/TYPE OF CONSULTANT	RATE OF COMPENSATION (DAILY OR HOURLY)	NO. OF DAYS (OR HOURS) ON PROJECT	IMLS	APPLICANT	TOTAL
TOTAL CONSULTANT FEES			\$		

### TRAVEL

FROM/TO	NUMBER OF: PERSONS DAYS	SUBSISTENCE COSTS	TRANSPORTATION COSTS	IMLS	APPLICANT	TOTAL
	( ) ( )					
	( ) ( )					
	( ) ( )					
	( ) ( )					
TOTAL TRAVEL COSTS				\$		

# Project Budget Form

## SECTION 2: EDUCATION DETAILED BUDGET CONTINUED

 Year ☐ 1 ☒ 2 ☐ 3

### MATERIALS, SUPPLIES AND EQUIPMENT

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
<b>TOTAL COST OF MATERIALS, SUPPLIES, &amp; EQUIPMENT</b>		\$ _____	_____	_____

### SERVICES

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
<b>TOTAL SERVICES COSTS</b>		\$ _____	_____	_____

### OTHER

ITEM	METHOD OF COST COMPUTATION	IMLS	APPLICANT	TOTAL
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
<b>TOTAL OTHER COSTS</b>		\$ _____	_____	_____

<b>TOTAL DIRECT PROJECT COSTS</b>	\$ _____	\$205.50	\$205.50
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### INDIRECT COSTS

Check either item A or B and complete C. (See section on Indirect Costs, pages 3.4–3.5.)

Applicant organization is using:

- ☐ A. An indirect cost rate which does not exceed 15 percent of modified total direct costs charged to IMLS.  
☐ B. Federally negotiated indirect cost rate (see pages 3.4–3.5).

 \_\_\_\_\_  
 Name of Federal Agency

 \_\_\_\_\_  
 Expiration Date of Agreement

Rate base amount

15 \_\_\_\_\_ % of \$ \_\_\_\_\_ \$205.50 = \$ \_\_\_\_\_ \$30.82

	IMLS	APPLICANT	TOTAL
<b>C. TOTAL INDIRECT COSTS</b>	\$ _____	\$30.83	\$30.82

# Project Budget Form

## SECTION 1: SUMMARY BUDGET, CPS AND EDUCATION COMPONENTS

Name of Applicant Organization L. C. Bates Museum

IMPORTANT! READ INSTRUCTIONS ON PAGES 3.3–3.5 BEFORE PROCEEDING.

### DIRECT COSTS

	IMLS	Applicant	Total
SALARIES & WAGES		\$22,141.50	\$22,141.50
FRINGE BENEFITS		\$1,068.25	\$1,068.25
CONSULTANT FEES	\$14,200		\$14,200
TRAVEL	\$43.30	\$1,440	\$1,483.30
MATERIALS, SUPPLIES & EQUIPMENT	\$5,765.73	160	\$5,925.73
SERVICES	\$1,206	\$415	\$1,621
OTHER	\$90	\$926.40	\$1,016.40
<b>TOTAL DIRECT COSTS</b>	\$ 21,305.03	\$ 26,151.15	\$ 47,456.18
<b>INDIRECT COSTS</b>	\$	\$ 3,921.77	\$ 3,921.77
<b>TOTAL PROJECT COSTS</b>		\$ 51,377.95	

AMOUNT OF CASH-MATCH \$ 1,000

AMOUNT OF IN-KIND CONTRIBUTIONS \$ 29,072.92

TOTAL AMOUNT OF MATCH (CASH & IN-KIND CONTRIBUTIONS) \$ 30,072.92

AMOUNT REQUESTED FROM IMLS, INCLUDING INDIRECT COSTS \$ 21,305.03

PERCENTAGE OF TOTAL PROJECT COSTS REQUESTED FROM IMLS 41 %  
(MAY NOT EXCEED 50%)

Have you received or requested funds for any of these project activities from another federal agency?

(Please check one) ☐ Yes ☒ No

If yes, name of agency \_\_\_\_\_

Request/Award amount \_\_\_\_\_